National Library
of Canada

Acquisitions and
Bibliographic Services Branch

395 Wellington Street
Ottawa, Ontario
K1A 0N4

Bibliothèque nationale
du Canada

Direction des acquisitions et
des services bibliographiques

395, rue Wellington
Ottawa (Ontario)
K1A 0N4

Your file Votre référence

Our file Notre référence

NOTICE

The quality of this microform is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Reproduction in full or in part of this microform is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30, and subsequent amendments.

AVIS

La qualité de cette microforme dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

La reproduction, même partielle, de cette microforme est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30, et ses amendements subséquents.

Canada

UNIVERSITY OF ALBERTA

Coaches' decision making about the participation of injured athletes in competition

BY ©

Catharina C.A. Vergeer

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY.

DEPARTMENT OF PHYSICAL EDUCATION AND SPORT STUDIES

Edmonton, Alberta
Spring, 1994

National Library
of Canada

Acquisitions and
Bibliographic Services Branch

395 Wellington Street
Ottawa, Ontario
K1A 0N4

Bibliothèque nationale
du Canada

Direction des acquisitions et
des services bibliographiques

395, rue Wellington
Ottawa (Ontario)
K1A 0N4

Your file Votre référence

Our file Notre référence

The author has granted an irrevocable non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of his/her thesis by any means and in any form or format, making this thesis available to interested persons.

L'auteur a accordé une licence irrévocable et non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de sa thèse de quelque manière et sous quelque forme que ce soit pour mettre des exemplaires de cette thèse à la disposition des personnes intéressées.

The author retains ownership of the copyright in his/her thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without his/her permission.

L'auteur conserve la propriété du droit d'auteur qui protège sa thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

ISBN 0-612-11400-7

Canadä

UNIVERSITY OF ALBERTA

RELEASE FORM

NAME OF AUTHOR: **Catharina C.A. Vergeer**

TITLE OF THESIS: **Coaches' decision making about the participation of injured athletes in competition**

DEGREE: **Doctor of Philosophy**

YEAR THIS DEGREE GRANTED: **1994**

Permission is hereby granted to the University of Alberta Library to reproduce single copies of this thesis and to lend or sell such copies for private, scholarly or scientific research purposes only.

The author reserves all other publication and other rights in association with the copyright in the thesis, and except as hereinbefore provided neither the thesis nor any substantial portion thereof may be printed or otherwise reproduced in any material form whatever without the author's prior written permission.

Damiaanstraat 4
4834 WE Breda
The Netherlands

Date: April 22, 1994

UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled COACHES' DECISION MAKING ABOUT THE PARTICIPATION OF INJURED ATHLETES IN COMPETITION submitted by CATHARINA C.A. VERGEER in partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY.

J.M. Hogg
Dr. John Hogg (Supervisor)

Dr. Leonard Wankel (Chairman)

Linda Thompson
Dr. Linda Thompson

Dr. Richard Johnson

Dr. Graham J. Fishburne
Dr. Graham Fishburne

Dr. Bruce Howe (External Examiner)
University of Victoria

Date: April 20th, 1994

DEDICATION

aan mijn ouders

voor jullie liefde en steun bij alles wat ik heb ondernomen,
zelfs als jullie het er misschien niet mee eens waren

aan Janneke en Gerard

voor jullie onbetaalbare vriendschap

ABSTRACT

The purpose of this study was to gain insight into the strategies and considerations employed by coaches in their decision making about the participation of injured athletes in competition, and to acquire an understanding of the factors that influence these strategies and considerations. For this purpose, a telephone survey was conducted involving 64 coaches training female gymnasts of various competitive levels. Quantitative as well as qualitative information was collected, about both coaches' decisions and their sociographic characteristics. The coaches were presented with hypothetical scenarios depicting situations in which an athlete suffered an ankle injury prior to a competition, but was still eager to compete. Four factors, age and ability level of the gymnast, severity of the injury and importance of the competition, were systematically varied in a total of 16 scenarios. Using a multi-linear polynomial model, decision policies were calculated at the individual and aggregate level. In addition, verbal responses were analyzed qualitatively to detect strategies and considerations used in the decision-making process. The analyses comprised three different perspectives: (a) the whole group, (b) subgroups differing in decision policies, and (c) subgroups involved with different competitive levels. The results indicated that most coaches were sensitive to the idiosyncratic conditions surrounding the injury. Values reflecting the importance of competitive achievement and positive psychological outcomes played a major role in their decisions, particularly if the risk of reinjury was perceived to be relatively low. Judgments of risks themselves tended to be influenced by coaches' personal injury histories, and by several beliefs about characteristics or situations that increase injury risk. A comparison between coaches of different competitive levels indicated that coaches at lower competitive levels tended to allow competing more readily than coaches at elite levels, especially in the case of better athletes and important competitions. The results are discussed in light of theoretical implications in the area of everyday and coaches' decision making, and of practical and ethical implications in the area of coach education and injury management.

ACKNOWLEDGEMENTS

I would like to thank all the people who have helped me in the process of conducting my study and writing this dissertation. My first thanks go to Gerard van der Steenhoven, who convinced me that doing a doctorate was not such an impossibility as I believed.

I want to thank my supervisor Dr. John Hogg who took the gamble of taking on a 'Dutch girl' as his first Ph.D. student. I sincerely thank him for his help, support and patience through the years, for his open door policy, his sense of humor and for sharing his enthusiasm for the applied side of sport psychology. I learned a lot from him.

Thanks to my committee members, Dr. Len Wankel, for his interest in my study and his meticulous editing; Dr. Linda Thompson, for her enthusiasm about my study and help in designing my questionnaire; Dr. Graham Fishburn for the thought provoking discussions; my external examiner Dr. Bruce Howe for his helpful comments on the final version of my dissertation. I am particularly grateful to Dr. Ric Johnson, for his help with the conjoint part of the study, for his friendly approach and for helping me gain a better understanding of decision-making theories. I also like to thank Dr. Murray Smith, for his positive and stimulating approach and for making my Candidacy Oral an enjoyable experience.

This thesis could never have been written without the cooperation of the coaches whom I interviewed. My sincere thanks to all for taking the time to answer my questions. I also greatfully acknowledge the financial support provided by the Sports Medicine Council of Alberta, and the organizational support provided by the Alberta Gymnastics Federation.

Furthermore, I want to thank Liz Harrisson for her help and enthusiasm in the initial phases of the study and the opportunity to discuss the descriptions of the injury. I also like to thank Dr. Terry Taerum. His friendly welcome whenever I came in with yet another statistical question is greatly appreciated.

Further, I like to extend my appreciation to Peter de Heus for taking the time to discuss my findings last summer, and to Billy Strean for giving me a copy of his dissertation when he first arrived in Edmonton. His work greatly helped me in sharpening my conceptions on the role of values in coaches' thinking and behavior.

Thanks to my roommates, Pam and Alan Wilman, for bearing with me while I was monopolizing the phone for hours on end. And thanks to my 'carrel mates' for their presence and moral support in the past years; in particular Helen Williamson, for sharing the foreign students experience and her poetic self; Deb Covey, for her practical contributions to my theoretical mind; Roger Couture, for his 'counselling' advice and for believing in me; Mike Heine, for his friendship, the coffees, the beers and the early morning breakfasts; Dennis Nighswonger, for our discussions about coaching philosophy; Ian Pike, for always being available to discuss statistics; Ken Ross, for our long conversation about life; Carol Hills, for her bubbling presence; John Hudec, for always finding a topic to talk about and distract me; Nicky Duenkel, for alternately telling me to go to work or get a life; and Mark Burgess, for matching my carrel in organized messiness.

I also want to thank Roger Senecal, for his love and support during the greater part of my studies.

Een speciaal woord van dank aan mijn broers en zussen, vriendinnen en vrienden in Nederland die op afstand steeds hebben meegeleefd. Jullie steun en medeleven zijn heel erg gewaardeerd.

Tot slot, hartelijk dank aan Maddeleen Alkema. Zonder haar zou de afronding van mijn proefschrift een stuk minder 'bearable' zijn geweest.

TABLE OF CONTENTS

LIST OF TABLES, FIGURES AND BOXES

LIST OF ABBREVIATIONS

CHAPTER I: STATEMENT OF THE PROBLEM

Introduction 1
Justification of the study 6
Purpose of the study 6

CHAPTER II: REVIEW OF THE LITERATURE

Introduction 8
Athletic injuries 8
Theories of decision making 18
Task types and characteristics 31
Decision making in everyday life 34
Decision variation 37
Coaches' decision making about injured athletes 41
Summary and conclusions 44

CHAPTER III: METHOD AND PROCEDURES

Introduction 46
Design 46
Data collection 46
Questionnaire 48
Data analysis 50
Delimitations and limitations 52
Summary 52

CHAPTER IV: RESULTS

PART I: Background of the coaches 54
Demographics 54
Education 56
Injury background 57
Injury management 58
Summary of Part I 62
PART II: Qualitative analysis of the coaches' decisions 62
Introduction 62
Decision outcome modifications 63
Alternatives to competing 66
Managing strategies 67
Considerations and arguments 69
Questions 86
Summary of Part II 86
PART III: Decision policies 87
Introduction 87
Overall decision policies 87
Inter-individual differences in decision policy 88

CHAPTER IV: RESULTS - continued

Differences in decision policies between competitive levels 97
Possible differences between the two datasets 101
Summary of Part III 102
PART IV: Individual differences between coaches 103
Introduction 103
Categorization of coach characteristics 104
Cluster membership and coach characteristics 105
Summary of Part IV 110
PART V: Quantification of considerations 110
Introduction 110
Quantification 110
Statements with highest frequencies 111
The relationship between statements and parameter levels 112
Statements differentiating between the two clusters 120
Statements differentiating between coaches at different competitive levels 123
Summary of Part V 128

CHAPTER V: SUMMARY AND DISCUSSION

SUMMARY 130
Results 131
DISCUSSION 138
Cognitive (decision) theories 138
Managing strategies 142
Personal history 143
Mental representation of the decision problem 145
Differences between competitive levels 153
Methodological issues 154
Generalizability to real life situations 157
Responsibility 158
Coaches' decision making 162
Recommendations 164
Final comments 167

REFERENCES 169

APPENDIXES

APPENDIX A: Letter to coaches 181
APPENDIX B: Questionnaire 183
APPENDIX C: Extra information 192
APPENDIX D: Statements 194
APPENDIX E: Background variables 198

LIST OF TABLES, FIGURES & BOXES

Tables | Page

Table 4.1.1 Highest levels of competitive involvement, present and past 55
Table 4.3.1 Repeated measures within factor ANOVA on the scenario data 90
Table 4.3.2 Regression coefficients for cluster I and cluster II 92
Table 4.3.3 Two-way ANOVA with repeated measures on scenario data and competitive levels 98
Table 4.3.4 Multiple comparisons between competitive levels for age*ability*meet 98
Table 4.3.5 Significant age*ability*meet interactions within competitive levels 100
Table 4.4.1 Relationship between cluster membership and coach characteristics 106
Table 4.4.2 Significant relationships between cluster membership and coach characteristics 107
Table 4.5.1 The total number of statements made in response to the consecutive scenarios 113
Table 5.1 Summary of the overall decision policies and statements for the whole group 132
Table 5.2 Summary of the decision policies and statements for the two clusters 135
Table 5.3 Summary of the decision policies and statements for different competitive levels 137

Figures

Figure 4.1.1 Plot of HOMALS analysis on club variables 61
Figure 4.3.1 Four-way interaction broken down according to injury and age 89
Figure 4.3.2 The differences between cluster I and cluster II in injury-meet interaction 93
Figure 4.3.3 Means per parameter level for both clusters 94
Figure 4.3.4 Significant two-way interactions within the policies for cluster I 95
Figure 4.3.5 Four-way interaction for cluster II 96
Figure 4.3.6 Differences between competitive levels in age*ability*meet interaction 99
Figure 4.3.7 Age*ability*meet interactions within each competitive level 100
Figure 4.4.1 Plot of HOMALS analysis on injury history variables 110

Boxes

Box 3.1 Text of the first two scenarios 49
Box 4.2.1.a & b Selected quotes regarding modifications 64-65
Box 4.2.2 Selected quotes regarding alternatives 66
Box 4.2.3 Selected quotes regarding ability level 70
Box 4.2.4 Selected quotes regarding age 72
Box 4.2.5 Selected quotes regarding the importance of the meet 74
Box 4.2.6 Selected quotes of comments made regarding the injury 76
Box 4.2.7.a & b Selected quotes regarding individual athlete characteristics 79-80
Box 4.2.8.a & b Selected quotes regarding the athlete's experience 82-83
Box 4.5.1 Statements made most frequently by the whole group of coaches 112
Box 4.5.2 Statements differentiating most between the two levels of injury 116
Box 4.5.3 Statements differentiating most between the two levels of age 117
Box 4.5.4 Statements differentiating most between the two levels of ability 118
Box 4.5.5 Statements differentiating most between the two levels of meet 119
Box 4.5.6 Statements differentiating most between the two clusters 122
Box 4.5.7.a - c Statements differentiating most between the competitive levels 124-126

LIST OF ABBREVIATIONS

	INJURY	AGE	ABILITY	MEET
M8AQ	moderate	8	average	qualifying
M8AT	moderate	8	average	tournament
M8BQ	moderate	8	best	qualifying
M8BT	moderate	8	best	tournament
M15AQ	moderate	15	average	qualifying
M15AT	moderate	15	average	tournament
M15BQ	moderate	15	best	qualifying
M15BT	moderate	15	best	tournament
Sv8AQ	severe	8	average	qualifying
Sv8AT	severe	8	average	tournament
Sv8BQ	severe	8	best	qualifying
Sv8BT	severe	8	best	tournament
Sv15AQ	severe	15	average	qualifying
Sv15AT	severe	15	average	tournament
Sv15BQ	severe	15	best	qualifying
Sv15BT	severe	15	best	tournament

CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

"I think you'd have to take a gun and shoot him for him not to play. He would shoot me if I don't play him". This comment was highlighted as one of the 'quotes of the day' in a major local newspaper recently. It came from the coach of a professional baseball team, referring to one of his players who was bothered by a lower back strain. Fortunately, most coaches do not have to deal with such uncanny threats when the time comes to make a decision about an injured athlete's participation in competition. However, this quote does seem illustrative of the emotional intensity involved in some of these decisions.

The risk of injury is an inherent part of the sports experience. Injuries occur at any level and in any type of physical activity, although the risks vary according to the nature of the activity and the level of involvement. Once an injury has occurred, a host of interacting and co-acting factors are involved in how an athlete handles the situation (Heil, 1993a; Rose, 1991). Among the tasks facing an athlete who sustains an injury is the need to acknowledge the injury, take appropriate measures to treat the injury, and engage in behavior that will prevent aggravation and enhance healing (Rose, 1991). This means paying attention to the messages of the body, properly interpreting these messages, and making appropriate decisions regarding the behavior in which one should or should not engage. Although the literature regarding athletes' reactions to injury is limited, there are some indications that athletes, highly motivated athletes in particular, tend to show various degrees of denial with regard to an injury, sometimes disregarding medical advice and engaging in activities that are not conducive to proper healing (Kent, 1982; Rose, 1991; Weiss & Troxel, 1986; Wroble, Mysnyk, Foster & Albright, 1986). This lack of 'sound judgment' (Flint, 1988) on the part of the athlete is not so surprising when one realizes that a myriad of factors impact upon the athlete at a time of injury, and that certain knowledge and skills are needed to adequately deal with these factors. For example, many situational and intra-personal factors affect the perception and experience of pain (Petrie, 1967; Fine, 1993). In addition, a certain amount of expertise and know-how is necessary in order to correctly interpret the symptoms of the injury and undertake suitable actions (e.g. find treatment, avoid activities that will impede healing). Because healing is a process of progressive change, interrupted sometimes by plateaus or setbacks, the degree of damage is changing over time and the extent of the healing needs to be re-assessed regularly.

As a matter of fact, such an assessment is almost imperative every time a decision about involvement in an activity that puts stress on injury is called for, be it everyday chores, training or competition. Not only is the degree of knowledge about injury symptoms important at those times, personal and societal values will come into play as well, notably if the decision involves choosing between competing or not competing.

It has been suggested by several authors (Flint, 1988; Heil, 1993b; Strean, 1993) that there may be a 'trickle down' effect of the values from the highly visible elite amateur and professional sports to the lower competitive levels. While some anecdotal evidence for the existence of this trickle down effect has been offered (e.g. Strean, 1993, p.107), no studies have investigated the extent of this effect. However, there is no doubt that people are perpetually exposed to these values through the media. Television provides access to national and international, amateur and professional championships, and newspapers publish quotes like the one cited at the beginning of this chapter. With regard to injuries the value seems to be transferred that pain is normal and acceptable, especially when the competition is important. Furthermore, there tends to be more attention for the high performance athlete who decides to compete despite pain and injury and is successful, than for the athlete who makes the same decision and is not successful or aggravates the injury. This may stimulate a lop-sided vision of the chances of success when competing with an injury. As Heil (1993b, p.263) noted after describing how a magazine advertisement had highlighted an American Olympic downhill skier's decision to race on a just incurred injury, "Andy Mill's success affirms that he made the right choice and all is well. Of course, this will not always be the case."

Obviously, a certain level of mental toughness is necessary to attain higher levels of competition. However, there is a fine line between training and competing with benign pain, and disregarding the harmful pain of an injury while putting more stress on the tissue involved. The media tend to show us that this line gets blurred somewhat at the high performance levels. Invariably, one or more of the gymnasts participating in major international championships competes on an injured ankle or foot. Most recently, during the 1993 World Championships, a Romanian gymnast won a silver medal in the floor routine while competing on a frozen ankle. Several questions arise concerning athletes who compete on injured limbs. They concern three issues: (a) the degree of damage the athlete is doing to herself and her future well-being by taking the risks that she does, (b) the locus of the responsibility for the decision to compete and the considerations involved in that decision (who decided to take the risks, and was this person aware of the possible consequences?), and (c) the pervasiveness of the attitude that competing on injuries is acceptable, or worthwhile, at lower competitive levels.

The first question is hard to answer, as no studies seem to be available about the long term physical effects of competing with injuries. There is some evidence regarding short term consequences, indicating that there is a definite risk of reinjury (Wroble, Mysnyk, Foster & Albright, 1986).

The second question, regarding the location of the responsibility for these decisions touches upon ethical and legal considerations. One may assume that at the elite competitive levels, medical professionals are available who either make the decision about competing, or provide information regarding the risks of competing, so that the person making the decision can do this in an 'informed' way. At these levels too, a lot of investments have been made, and the stakes may be high, especially at major international competitions. The most optimal condition at these levels probably occurs when the decision is made by a mature athlete who is (a) fully aware of all the risks and potential consequences involved, and (b) not subjected to any external pressures from a coach or others who might benefit from the decision. Even then, some might argue that the athlete needs to be protected against him or her self, and the decision should rest with an 'independent' medical specialist.

Most decision situations however, are not optimal; in many cases the athletes are younger, the investments not as high, and appropriate medical advice not readily available. Because coaches, by virtue of their leadership role, are expected to provide responsible care and act 'in loco parentis' (Flint, 1988; Gray, 1990; Kligman, 1989), they are likely to be the ones to take on the responsibility of making decisions about an injured athlete's participation in a competition. Flint and Weiss (1992) reported that 58% of the high school basketball coaches in their study indicated that they made the final decision to return an injured player to the game. This percentage was reduced to approximately 30% for varsity basketball coaches; 70% of these coaches said that the decision was made by an athletic trainer. This suggests that the lower the competitive level, the more likely that the responsibility will fall to the coach when it comes to decisions about injuries. In a study of 30 high school coaches Stapleton, Tomlinson, Shepard and Coon (1984) found that in all cases athletes reported to the coach first when injured. In this study, as well as two other American studies which focused on high school coaches (Porter, Noble & Bachman, 1980; Redfearn, 1980), a majority of the coaches assumed responsibilities for immediate injury care and rehabilitation. This was the case even though more than half of them felt uncomfortable with injury management due to inadequate training. Stapleton et al. (1984) concluded that coaches seemed to be "filling the void" because there was no money to involve health care professionals, or simply no recognition of the needs of coaches.

Little is known about the third question, the extent to which the attitude that competing with an injury is acceptable is present at the lower competitive levels. One study that investigated decision making regarding the participation of injured athletes in competition (Flint, 1988, also reported in Flint & Weiss, 1992), compared the decisions of high school and university basketball coaches with those of athletic therapists. It was found that when minor to moderate injuries occurred during a competition, coaches' decisions tended to be influenced by a combination of player's status and the game situation. Athletic therapists, on the other hand, although influenced somewhat by the criticality of the situation, tended to make their decisions based primarily on the extent of the injury. Flint noted that this apparent difference in decision making between coaches and athletic therapists may be due to the role of the coach, which requires juggling a number of different goals that are not always compatible. Flint recommended therefore, that, in the best interest of the athlete, decisions regarding the participation of an injured athlete in competition be made by an athletic therapist or other medically trained professional rather than by the coach, because the former would have the health of the athlete in mind, whereas the latter may be tempted to compromise the health of the athlete in the pursuit of competitive goals. However, for many clubs and coaches, especially at lower competitive levels or in areas where athletic therapists are not readily available, this may not be an option.

There is likely considerable variation in both the injury management training of coaches and the availability of health care professionals across different sports, levels of competition and local circumstances. In Canada coaches are not required to take first aid or injury care courses in order to become qualified. The National Coaching Certification Program (NCCP) goes as far as strongly recommending that coaches take first aid and cardiopulmonary resuscitation (CPR) courses. As well, in the Theory Level I and II manuals some brief guidelines are provided for the recognition of injury types, administration of primary care and decisions about return to activity. It is not known however, how many coaches do indeed take these courses or how well the theory I and II information prepares coaches to make judgments and decisions regarding injured athletes. Sometimes athletic therapists are available for assessing injuries and providing rehabilitative care, but thus far their services seem to be used mainly in team sports, during tournaments and at higher competitive levels [1]. Therefore, it may be assumed that many coaches play a major role in injury management, including immediate care of traumatic injuries, dealing with overuse injuries, rehabilitation and decisions about return to activity.

Considering this responsibility in combination with the lack of adequate and formal training of many coaches (Flint, 1988; Redfearn, 1980) one may wonder what the impact of coaches' decisions and activities is on the healing of injuries, and it is not surprising that the medical community shows some concern about the quality of the care provided by the coach (Kegerreis, 1983; Stapleton et al., 1984). Several researchers have indicated that a considerable proportion of the injuries sustained by athletes during the course of a study were recurrent (Bale & Goodway, 1990; Caine, Cochrane, Caine & Zemper, 1989; Lysens et al., 1984). Underestimation of the severity of the injury, inadequate rehabilitation and a premature return to activity were mentioned as possible causes for these recurrences. It is possible that coaches play a role in some of the decisions that lead to the mismanagement of an injury, in particular decisions regarding the amount of stress that can be placed on the injured body part. The present study was designed to investigate the strategies and considerations that coaches use when making such a decision in a specific situation, namely participation in competition.

---

[1] Alberta Athletic Therapists Association, A. Langevin, personal communication, April 15, 1991.

Coaches' decision making

In comparison with other professions in which decisions directly affect people's lives, such as medicine, psychotherapy and teaching, coaches' decision making has received relatively little research attention. The only aspect of coaches' decision making that has been studied in a systematic fashion is decision style, a term used to describe the degree of athlete participation that coaches allow in their decision making (Chelladurai & Arnott, 1985; Chelladurai & Haggerty, 1978; Chelladurai, Haggerty & Baxter, 1989; Gordon, 1986a). This research stems from a leadership-style approach to decision making and focuses on the behavioral dimensions of this activity. Very little attention has been given to the cognitive dimensions of coaches' decision making, despite the fact that cognitions have been the focus of many theoretical and applied studies in the area of human decision making (e.g. Elstein, Shulman & Sprafka, 1990; Lord & Maher, 1990; Konecni & Ebbesen, 1982; Shavelson & Stern, 1981). Whereas humanistically oriented sport psychologists advocate an approach to coaching in which there is ample room for autonomy and self-determination by the athletes (Danziger, 1982; Hogg, 1990; Orlick, 1982; Sage, 1978), research so far indicates that both coaches and athletes expect the coach to be responsible for most of the decisions made in the athletic context (Chelladurai et al., 1989; Gordon, 1986a). It seems important therefore, to take a closer look at how coaches make decisions, what information they use, why they decide on one alternative and not another, and what factors impact on their strategies and choices. A few recent studies (Duke & Corlett, 1992; Flint & Weiss, 1992) have started to investigate such aspects of coaches' decision making, but have done so without much consideration of psychological decision theories.

The approach chosen for this study concentrates on the cognitive aspects of decision making. Theories that address these aspects of decision making can be found under such headings as 'information processing' (Lord & Maher, 1990), 'judgment analysis' (Stewart, 1988), 'policy capturing' (Borko & Cadwell, 1982) and 'process-tracing' (Shavelson & Stern, 1981). While a major part of the research using these approaches has focused on the generation of general knowledge about human decision making, using laboratory settings and problems that were often abstract or semi-mathematical in nature, these approaches have also been used to study decision making in specific everyday situations, for example, diagnostic decision making by physicians (Elstein et al., 1978), educational decision making by teachers (Borko & Cadwell, 1982), planning decision making by managers (Waller, 1988), bail-setting decisions by judges (Ebbesen & Konecni, 1982) or decision making by social workers in child abuse cases (Dalgleish, 1988). A variety of designs have been used in these studies, including case studies (Clarkson, 1963; Aikenhead, 1984), actual simulations in laboratory or field situations (Elstein et al, 1978; Peterson, Marx & and Clark, 1978), paper cases used in laboratory, semi-laboratory situations or (mail) survey designs (Holzman et al., 1984; Rovner, Rothert & Holmes, 1986), and stimulated recall designs (Mackay & Marland, 1980).

Authors in the sport psychology context have argued for applied research, studying sport psychology's phenomena in the sport setting rather than the laboratory (e.g. Martens, 1979, 1987), and more and more studies are indeed conducted in field settings. Studying the decision making of coaches regarding injured athletes within the natural setting is hampered somewhat however, by the sudden and unpredictable nature of injury occurrences. The choice of an appropriate method would seem to be between simulating actual situations by presenting coaches with hypothetical cases, or using qualitative methods such as interviews or observation. In this study, a combination of hypothetical cases and the interview format was followed.

Justification of the study

Coaches are required to make a large number of decisions, most of which will affect, directly or indirectly, the lives of athletes and their families. Yet, very little is known about the way in which coaches make decisions, or the factors that impact on their decisions. This study may provide an initial understanding of the factors involved in coaches' decision making, by highlighting the processes and influential factors relevant to coaches' decision making in a specific area, the participation of an injured athlete in competition. Many factors are involved in properly dealing with an injured body part, and not much is currently known about the role that coaches play in this process. It is likely that at some time or other most coaches will be faced with decisions regarding the degree and type of stress to be put on an injury, in particular when there is an important competition coming up. Very little information is currently available on how coaches make those decisions, what they consider and what factors influence the choices that they make. The only study available so far (Flint, 1988) suggests that coaches are influenced by considerations other than the health of the athlete. Insight into coaches' decision making in this area has practical importance as a substantial number of injuries are recurrent (Lysens et al., 1984; Caine et al., 1989) and athletes themselves may deny the actual severity of their injuries (Rose, 1991). The results of this study may permit recommendations for improvements in the education of coaches regarding decision making about the return of injured athletes to activity.

In addition, this study may shine a light on the pervasiveness of high performance values at lower competitive levels, that is, how coaches in their decision making use criteria that are endorsed in the media. This information may add an empirical facet to the discussion about the value of winning versus health and the need for a proper balance between the two.

Purpose of the study

The purpose of this study was to provide insight into the strategies and considerations employed by coaches in their decision making about injured athletes' participation in competition, and to gain an understanding of the factors that influence these strategies and considerations.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

The study of the decision making of coaches about the participation of injured athletes in competition leads to two different areas of the literature: (a) injuries, injured athletes and the responsibilities of coaches to injured athletes, and (b) general decision-making theories and research.

Athletic injuries

In this section several aspects of athletic injuries are described that may play a role in the decision making about return to activity. Presented are the reactions of the athlete to injury, the characteristics of injury and healing and coaches' roles and responsibilities with regard to injured athletes. It must be noted that athletic injuries in this review are taken as musculoskeletal injuries.

Psychological reactions to injury

It has often been assumed that athletes react to injury in a way similar to the way in which people respond to the confrontation with terminal illness (Elman, 1986; Gordon, 1986b; Pedersen, 1986; Rotella, 1982). They would experience the emotional stages identified by Kuebler-Ross (1969): denial, anger, bargaining, depression and acceptance. However, more recently empirical research among injured athletes has indicated that this 'grief model' is too rigid and incomplete for describing the psychological reactions of athletes to injury. There is evidence that these reactions do not necessarily pass through a number of sequential stages but may be more cyclical in nature (Rose & Jevne, 1993). It has also been found that athletes experience additional emotions to the ones implied by the grief model. Except for disbelief, anger and depression, such reactions as anxiety, worry, guilt, loneliness, inadequacy, loss of control and low self-confidence were found as well (Chan & Grossman, 1988; Rose, 1991; Weiss & Troxel, 1986).

It was also shown that the intensity of the negative emotional reactions is strongest in the first few days after the injury, decreasing once signs of healing and improvement are perceived, and that the negative emotions are stronger and longer lasting in more seriously injured athletes (McDonald & Hardy, 1990; Smith, Scott, O'Fallon & Young, 1990).

Although there are commonalities between athletes in their psychological reactions to the injured state, it has been emphasized that there are also considerable differences (Gordon, 1986b; Rose & Jevne, 1993). Being injured is in essence an idiosyncratic experience, and psychological reactions may vary greatly, depending on such factors as the severity and timing of the injury (Gordon, Milios & Grove, 1991a; Smith, Scott, O'Fallon & Young, 1990), the role and meaning of the sport or physical activity in the athlete's life (Rose, 1991); the athlete's coping style (Smith, Scott & Wiese, 1990), mental skills (Ievleva & Orlick, 1991), personality (Sanderson, 1981) and the social support that is available to him or her (Ford & Gordon, 1993; Gordon, Milios & Grove, 1991b).

Acknowledging the injury

The process of dealing with an injury starts with acknowledging that there is an injury that requires some kind of action. Rose (1991) gave considerable attention to this task, noting that acknowledgement of an injury includes the perception and proper interpretation of the symptoms, and the choice of an adequate response, such as decreasing the activity level and seeking and following medical advice. He also noticed that the degree of acknowledgement of an injury can be placed on a continuum that ranges from complete denial (ignoring the symptoms) to complete acceptance. The activity between the two extremes can be characterized as bargaining behavior. Bargaining entails a partial acceptance of the injury in that the athlete acknowledges most or some of the symptoms but is not prepared to deal with all the consequences. There is for instance a temporary reduction in activity, but it is followed by a premature return to sports, or the athlete seeks medical help and engages in therapy, but continues to participate in training or competition. Bargaining and denial were common reactions in the seven athletes interviewed by Rose. It was clear that, particularly with overuse injuries, these athletes tended to have a hard time acknowledging that they were injured. A similar conclusion was drawn in a study reported by Kent (1982), in which it was found that 45% of athletes visiting a sports injury clinic in Toronto had waited 5 days or more before seeking medical help and 10% had even waited 5 months or longer. Another study, among collegiate wrestlers (Wroble, Mysnyk, Foster & Albright, 1986), revealed that almost half of the injured wrestlers tended to partially or totally ignore medical recommendations, leading to significantly more recurrences of injuries than in wrestlers who were compliant.

There may be various reasons for this tendency to 'gamble' with one's health after an injury. Rose identified the following: (a) misconceptions about the severity and the consequences of the injury and the hope that it will go away by itself, (b) the use of pain reduction strategies, such as taking anti-inflammatories to help suppress pain while still competing, (c) attitudes like stubbornness, resistance against the medical prognosis, competitiveness, addiction to sport and feelings of invincibility, and (d) the phase of the season or of one's athletic career. Kent (1982) reported that athletes who tended to delay seeking medical advice were the ones with high achievement goals and those who thought that sport was a healthy life-enhancing activity. Rotella and Heyman (1986) suggested further that substitute players and borderline starters may be particularly vulnerable to denial and bargaining because of fear of losing the little playing time they have.

Motivation

Although limited, the empirical evidence so far suggests that motivated athletes have a tendency to deny the symptoms of injury and to bargain with the consequences. This tendency appears to be influenced by a lack of knowledge about injuries and their consequences, feelings of invulnerability, a high motivation or need to train or compete, and/or a fear of losing one's position on a team. The subjects in the above-mentioned studies were older adolescents and adults, engaged in both competitive and fitness activities. Although the reactions of younger age groups have not been investigated, it is plausible that denial and bargaining also occur in these groups, especially since lack of knowledge and feelings of invulnerability are likely to be present in younger athletes with little or no experience with injuries.

The following quote offers an illustration of how the motivation to compete can influence denial: "...and the knee was hurting rather a lot. It was clicking and I felt something moving, but I didn't want to say anything, because the Olympics were 6 weeks away. Just keep it to yourself, I thought, and it will be okay..." (Mary Lou Retton, 1984 Olympic champion in gymnastics; Retton, Karolyi & Powers, 1986, p.122). This quote also illustrates how the motivation to compete may impel athletes to try and keep their injuries hidden from their coaches. In this case, the story of the coach (Karolyi) read: "...during regular tumbling practices - nothing difficult, nothing extra-ordinary - Mary Lou mentioned that something was sore in her knee. The next morning when she woke up it was all blocked and swollen. Can you imagine?" (Retton et al., 1986, p.130). The communication of the athlete about the injury, and his or her motivation to be honest about the symptoms and pain, is clearly one of the factors complicating the decision of coaches about the participation of injured athletes in training and competition. Whether the athlete is motivated by the fear of not being allowed to compete or by the erroneous belief that the symptoms will subside by themselves, underreporting (or absence of reporting) of symptoms and pain may seriously jeopardize the coach's judgment about the severity of the injury. If the athlete does not honestly report injury symptoms, the only way the coach can get an impression of what is wrong is by reading the athlete's body language and motor behavior. This requires a strong familiarity with signs of injury and/or a long acquaintance with the athlete.

Although many athletes are motivated to return to activity as soon as possible, cases have been reported of athletes who are ambivalent or simply not motivated at all to make a fast return to training or competition (Moore, 1985; Pillemer & Micheli, 1988; Rotella & Campbell, 1983). Ambivalence may result when the athlete has a strong fear of reinjury, whereas a tendency to prolong the injured state as long as possible may be found when the injury serves a (positive) purpose for the athlete (e.g. gaining attention, missing heavy work outs, evading the possibility of being criticized for lack of skill or talent, or avoiding the pressure of an overly involved or pushy parent). With under- or unmotivated athletes the issues facing the coach are almost opposite from the ones produced by highly motivated athletes. Instead of minimizing the pain and symptoms, these athletes may exaggerate them, still making it difficult for the coach to assess the real state of damage and healing, and the question may turn into "Should I push this athlete?" rather than "Should I prevent this athlete from participating?"

Pain perception

Judging the amount of damage present can further be complicated by the fact that, even if an athlete reports pain accurately as he or she feels it, pain in itself is not a purely objective indicator of degree of damage. Pain perception is influenced by both individual and situational factors. For instance, the amount of attention that is paid to the symptom will affect the perception of pain (this can be noted, for example, during games when athletes often fail to notice pain from an injury because their attention is so strongly focused on the competition). Athletes may also force their attention away from pain guided by the attitude that pain is an integral part of sport. Mary Lou Retton: "If you're a gymnast something is always hurting, but you still train. You just have to learn to live with discomfort" (Retton et al., 1986, p.107). Some people naturally tend to reduce incoming stimuli and need more stimulation before they feel something, whereas others tend to augment incoming stimuli and are very sensitive to stimulation. The former have been called reducers (Petrie, 1967) or extraverts (Eysenck & Eysenck, 1985), the latter augmenters or introverts respectively. Lynn and Eysenck (1961) and Eysenck (1967) showed that extroverts have a higher pain threshold and pain tolerance than introverts. Sanderson (1981) suggested therefore, that introverted athletes would react more emotionally to and worry more about an injury. It is possible that such differences in reaction between athletes may affect coaches in their decision making.

Damage and healing

Athletic injuries have been categorized in various ways. A common classification is a division between acute or traumatic and gradual or overuse injuries (Lachman, 1988; Taylor & Taylor, 1988; Peterson & Renstroem, 1986). Acute injuries occur suddenly and are the result of either external impact or twisting, friction, stretching or shearing forces. They vary from minor traumas such as cuts and bruises to more serious injuries like bone fractures, torn ligaments, concussions and spinal cord injuries. Overuse injuries occur gradually as a result of repeated stress. They can develop in various tissues, including muscles, tendons, ligaments, and bones. The repeated mechanical stress disrupts the microstructure of the tissue, a process that often goes unnoticed until the symptoms become so painful that they can no longer be ignored or denied. Overuse injuries are often equated with chronic injuries, but according to Lachman (1988) chronic injuries may develop from either acute or overuse injuries when they are neglected or not properly treated.

The healing process

The body's response to any physical trauma, whether it is of an acute or gradual nature, involves a process of inflammation and healing and follows a reasonably predictable sequence (Booher & Thibodeau, 1989). Inflammation is a general defense mechanism of the body against trauma. This mechanism is valuable in that it localizes the extent of the injured area and rids it of waste substances, thereby preparing and enhancing the healing process. The physical signs indicating the inflammation stage are redness, swelling, heat, pain and loss of function. In addition to inflammation there is often muscle spasm in the area surrounding the injury. Muscle spasm may increase the pain, because the contracted muscles put pressure on nerve endings. The process of healing starts once the activity arising from the inflammatory process has localised the area and cleaned it enough to permit the growth of new tissue. Bones and skin have the ability to replace the damaged tissue with the same type of tissue as the original matter, but muscles, tendons, ligaments and other soft tissues do not have this ability to regenerate. The healing in these tissues occurs by scar formation. Scar tissue never becomes as strong as the original tissue, but a strength of 80% to 95% can be regained over time if the injury is properly managed (Lachman, 1988). The formation of scar tissue starts with the development of dense networks of capillaries and fibroblasts. These fibroblasts produce collagen fibres which become the main structure of the scar. Initially the scar tissue is fragile, highly vascular and sensitive to pressure and tension. As it matures the tissue changes. After sufficient collagen is manufactured the number of fibroblasts decreases and the collagen fibres, which were initially laid down in a random fashion, gradually change into more organized patterns. Over time, the scar grows stronger, becomes shorter and looses its vascularity and sensitivity (Booher & Thibodeau, 1989; Lachman, 1988). This process can sometimes continue for over a year.

The way in which the injury is treated is crucial for the quality of the (scar) tissue that develops. Rest is of primary importance, especially early in the treatment process. Resting the injured area allows the body to mobilize the proper resources for the healing process, and it avoids the risk of further damage. Booher and Thibodeau (1989) stated that athletes who continue to participate with an acute injury risk aggravating the damage, resulting in slower healing and a longer recovery process or even in permanent harm, such as joint instability or decrease in range of motion. Neglecting an injury increases the risk of the injury becoming chronic, when instead of repair there is repeated damage and continuous inflammation, resulting in the formation of lower quality scar tissue that remains vascular and painful (Arnheim, 1985; Lachman, 1988). Avoiding stress on the injured body part, particularly in the early stage of healing, is therefore of vital importance for a fast and optimal recovery. However, complete rest is not recommended. Immobilization of the tissue leads to atrophy and results in a criss-cross pattern of collagen fibres. An atrophied area of the body is more susceptible to reinjury, whereas a cris cross pattern of collagen fibres will result in a tight, puckery scar once the tissue contracts and shortens. The ideal pattern of collagen fibres, leading to a strong and supple scar, is one in which the fibres are lined up parallel to the direction of the force that acts on the tissue (Lachman, 1988). This pattern will develop if the injured body part is properly conditioned during the healing process, for instance by stretching and range of motion exercises. There is a fine line however, between beneficial and harmful exercising. If the strength of the injured tissue is overestimated, it may easily be stressed too much or too soon.

Return to activity

Knowing the strength of the injured tissue is also an important factor in deciding to return an injured athlete to training and competition. Since it is generally not possible or desirable to look inside the tissue in order to assess the degree of damage and healing, the extent of the healing needs to be inferred from external signs. Commonly mentioned indicators of the degree of damage that is (still) present are pain, swelling, limited range of motion, loss of function, muscle spasms and muscle weakness (Arnheim, 1985; Booher & Thibodeau, 1989). The general recommendation in the sport medical literature is that an injured athlete should not be returned to full activity until the levels of power, flexibility, endurance, speed, agility and coordination, in other words ‘functional capacity’ (Kegerreis, 1983) have been fully restored. For many injuries more or less specific guidelines and recommendations exist for the assessment and improvement of these levels, as well as for the expected timing of return to activity (Arnheim, 1985; Reider, 1991). Physical and athletic therapists can be expected, because of their training and experience, to effectively implement these guidelines with specific injured athletes. Coaches however, usually lack this training and experience. In the Theory Level I manual of the Canadian National Coaching Certification Program (NCCP) (1991a) full recovery is defined as: "100% range of movement, 100% return of strength, absence of pain, psychological readiness and the ability to perform the skills of the chosen activity". Four succinct guidelines are given to help the coach determine whether an athlete is ready to return to activity: (a) performance of simple movements that are required during activity, at a slow speed, (b) gradual increase of activity if there is no pain or altered function, (c) checking for apprehension by asking how the athlete feels about the skill or activity that caused the injury, and (d) referral for further medical attention if there is any doubt about the athlete’s readiness to return. The NCCP Theory Level II manual (1991b) expands on this information by providing some guidelines for dealing with athletes who resist rest or reduction in training, such as emphasizing that rest is essential to recovery, that patience is very important and that a premature return to activity may only put the athlete further behind, not ahead. As well, two sample progressions are provided of movements and drills that the athlete needs to be able to perform without experiencing discomfort or pain, before returning to full activity.

Although coaches are provided with information and recommendations to guide their decisions about injured athletes' participation in activity, it is questionable whether all coaches do indeed follow these guidelines. Both the ability to accurately assess full recovery and athletic goals may play a role in this process. When the injury is obviously severe or there is still pain, loss of function and a clear risk of aggravating the injury, most coaches will likely keep the athlete out of competition. But there is a grey area in which injuries are minor to moderate, or almost healed, where other considerations than the health of the athlete may co-determine the decision of the coach about return to activity.

Coaches' roles and responsibilities

A few studies have investigated the role of coaches in dealing with injured athletes. Three studies carried out in the United States examined the responsibilities of high school coaches in managing athletic injuries (Porter, Noble, Bachman & Hoover, 1980; Redfearn, 1980; Stapleton, Tomlinson, Shepard & Coon, 1984). It was found that a considerable number of coaches played a primary role in deciding whether an athlete could return to competition (45-60%) and practice (77%). Around one half of the sampled coaches were certified in first aid and about one third in Cardiopulmonary Resuscitation (CPR). Approximately half of the coaches (50-58%) reported that they managed the rehabilitation of injured athletes, although more than half (56-57%) indicated that they felt uncomfortable with handling medical responsibilities because of lack of adequate knowledge and training. Stapleton et al. (1984) found that following physician prescriptions (40%) and administering modality treatment (37%) were the most common activities of coaches carried out as rehabilitative care. They also asked which guidelines the coaches used in order to cautiously manage athletes' injuries. The following answers were provided: use basic first aid principles (50%), know athletes' limitations and abilities (50%), seek help from medical professionals (47%), rely on coaching experience (20%), contact parents (20%), and stop athlete's activity (20%). Another American survey (Rowe & Robertson, 1986) examined the extent of the knowledge base regarding care and prevention of athletic injuries of persons in charge of treating injured athletes in high schools in the state of Alabama. Almost 90% of those responsible for injury care turned out to be coaches, of whom close to 60% had a background in physical education. Yet, Rowe and Robertson found that only 27% met the criterion level of 70% that was set as a satisfactory level of overall knowledge regarding injury care and prevention; knowledge was especially low in the areas of anatomy, care and treatment, conditioning and equipment. The authors concluded that this deficiency would possibly lead to "hundreds of incorrect decisions being made daily"

(p. 119), and indicated that retraining programs had been instigated for the persons in charge of athletic injuries in high schools in Alabama.

Few studies have thus far investigated the extent of the responsibility or the level of knowledge regarding injury care and management among Canadian coaches. Only Flint and Weiss's (1992) study gave some small indication, finding that 30% of university basketball coaches were responsible for making the decision as to whether or not an injured athlete could return to play. No such data are available for coaches of other sports or involved at different competitive levels. Coaches in Canada are generally required to take certification courses through the National Coaching Certification Program (NCCP) before they are allowed to coach. However, there is no requirement to take first aid courses or to educate oneself regarding injury rehabilitation. The National Coaching Certification Program goes as far as strongly recommending formal training in emergency first aid and CPR, and providing basic information about injury prevention, types of injuries, emergency conditions, fundamental injury care and return to activity. The written information in the NCCP Level I and II Theory manuals is supplemented with a one hour session for each course in which various aspects of dealing with injuries are discussed. Some national sport federations may demand that their coaches take first aid or injury management courses as part of their technical program. It is also likely that a substantial number of individuals coaching within the Canadian sport system have a degree in Physical Education and can be expected to be familiar with anatomy, physiology, first aid and some athletic therapy. However, this is apparently no guarantee for an up-to-date knowledge base as the results of Rowe and Robertson's study suggest. It is not known though if these results can be extrapolated to Canadian coaches with a degree in Physical Education. There is no research indicating how knowledgeable and skilled Canadian coaches actually are, or feel they are, in dealing with injured athletes. Therefore, the question raised by Stapleton et al. (1984) on *how responsible* coaches should be when it comes to making decisions about injury management and return to competition and practice, remains a valid one. Flint (1988) provided an argument against having coaches make the decision about returning injured athletes to competition. She found, in a study involving Canadian university basketball coaches, that coaches tend to weight other factors, such as the status of the player and the situation of the game (close call or obvious win or loss), in their decisions about having an injured athlete return to competition. Athletic therapists who responded to the same situations did not take these factors into account and appeared to base their decisions solely on the type of injury sustained by the athlete. Flint recommended that decisions about the return of injured athletes to a game must be made by someone other than the coach, preferably an athletic therapist. Because coaches need to juggle a number of goals which are sometimes incompatible, they would not always make the decision that is in the best interest of the injured athlete.

Lloyd, cited in Kent (1982), raised another significant point regarding coaches' responsibility, while reflecting on the finding that almost half of the patients visiting a Toronto athletic clinic had waited five days or more before seeking medical help: "Since 62% of our patients were being coached or instructed at the time of their injuries, it seems reasonable to assume that those who are training amateur athletes are themselves inadequately trained in the recognition of significant injury. However, the ultimate responsibility must lie with the individual athlete" (Kent, 1982, p.128). It is an interesting question whether this is indeed the location where the responsibility must lie. If the ultimate responsibility rests with the athlete, how far does the responsibility of the coach go? And how does this responsibility relate to the age of the athlete? From a legal perspective, a coach is under a duty to operate a reasonable and efficient safety system when coaching (Kligman, 1989). This means taking reasonable precautions to reduce unnecessary danger in the general organization and conduct of practice and competition, which may include seeing to it that an injured athlete receives proper medical attention and prohibiting an athlete from participating if necessary. A coach may be held liable for unreasonable acts or omissions in medical treatment which worsen the athlete's condition, for instance permitting a seriously injured athlete to participate (Kligman, 1989; Schubert, Smith and Trentadue, 1986). This responsibility exists regardless of the age and competitive level of the athletes, although mature athletes are also expected to act reasonably in protecting their own health (see the case of Robitaille v. Vancouver Hockey Club Ltd. described in Kligman, 1989, p.171).

Whereas there is potential for liability, the cases described in the most recent books and articles on tort liability in sports (Barnes, 1987; Kligman, 1989; Robertson & Robertson, 1988) suggest that there are very few cases that do actually involve negligent behavior on the part of the coach or instructor regarding an *existing* injury resulting in further damage. Most litigation cases in sport result from negligence in providing safe instructional circumstances, causing accidental injury without prior injury. It is unlikely that many actions of coaches regarding the participation of already injured athletes in competition will result in such severe injuries that the athlete involved will consider suing the coach. When this does happen, the majority of the complaints are allegedly settled outside of court and do not go to trial (Barnes, 1987; Gray, 1990). It is not simple therefore, to get an accurate impression of the number of litigation cases involving negligent behavior regarding an existing injury, but it seems unlikely that many such cases exist. Nevertheless, a legal obligation does remain to act as a reasonable person in relation to athletes' safety. Furthermore, even if legal standards are not used to judge the decisions made by coaches regarding injured athlete's participation in competition, ethical implications are never absent from such situations.

Ethics

Many professional organizations whose very existence is based on dealing with people (e.g.

physicians, teachers, psychologists and nurses) have developed codes of ethics to guide the conduct of their members. Coaching as a profession is relatively young, and it is still in the process of developing a code of ethics. The most recent (1992) NCCP Level III Theory manual presents a relatively brief code of ethics accepted by the Coaching Association of Canada and the Canadian Association of National Coaches, and a more extensive code of ethics, borrowed from the British Institute of Sports Coaches. Codes of ethics provide some guidelines for conduct, however, there may be cases where several of the ethical principles are in conflict, and then it is up to the coach's moral reasoning to decide which of the principles supersedes the other. Considering the fact that injured athletes tend to bargain with and deny their injuries, a moral conflict may arise in the case when an injured athlete wants to participate with definite risk of aggravating the injury. Should coaches protect injured athletes against themselves? On the one hand, coaches are expected to respect the right of the athlete to self-determination, on the other they are supposed to ensure the safety of their athletes. A study by Duquin (1984) examining the moral reasoning of coaches about situations of conflict between an athlete and a member of the athletic establishment, found that coaches most frequently made use of two rationales, called the ethic-of-care rationale and the self-interest rationale. The ethic of care can be equated with taking a 'parental' or 'paternalistic' attitude, reasoning from the perspective that adults (or the more powerful) need to behave in such a way as to protect the moral, physical or material welfare of those in their charge (or the less powerful). The self-interest rationale is based on the notion that individuals and institutions have the responsibility, and are expected, to pursue and protect their own self-interests. The study also showed a gender difference in that female coaches tended to apply the ethic-of-care rationale more whereas male coaches used the self-interest rationale more. Generalizing these results to coaches' decision-making regarding injured athletes' participation in competition, it may be expected that female coaches feel more responsible for making a decision for the athlete, and that male coaches are more inclined to leave the decision up to the athlete. The age of the athlete may also play a role in the amount of responsibility left to the athlete. It is plausible that a protective attitude will prevail with younger children, but it will be interesting to see to what age this protective attitude is pursued.

Summary of athletic injuries

Whereas the onset of sports injuries may be sudden or gradual, the physiological processes involved in the healing of various injuries follow a more or less uniform pattern: an inflammatory reaction followed by a process of rebuilding the damaged tissue, usually in the form of scar tissue. Proper treatment is crucial for the quality of the scar tissue that is constructed. This proper treatment generally includes rest (except for stretching and range of motion exercises after the inflammatory stage of the injury) and delay of activity until full functional capacity has been restored.

The athlete's reaction to an injury forms part of the input information defining the decision situation for the coach. Research so far indicates that injured athletes are likely to show various degrees of denial in acknowledging their injury, experience a range of negative emotions, and may disregard medical advice. These reactions may be especially strong when the athletes are highly motivated to train or compete, tend to feel invulnerable and lack knowledge about injury symptoms and consequences. The tendency to bargain with or deny an injury may lead to underreporting of the seriousness of the injury to the coach, thereby complicating his or her decision making about the level of activity that should be permitted to the athlete. Because coaches need to combine a number of goals and responsibilities that are not always compatible, it is possible that they will experience moral conflict in making a decision about the participation of an injured athlete in competition.

Theories of decision making

Human decision making is an intriguing phenomenon enjoying a widespread interest. Writers from a variety of fields, including organizational management, economics, law, politics, medicine, psychotherapy and teaching, have enriched the literature on decision making with both descriptive and prescriptive accounts. Interest in decision making from so many different perspectives has led to the development of an assortment of theories and models, some of which are quite specific to the situation in which they were formed, while others are more fundamental and general. The units to which these different decision-making theories apply vary from political systems to organizations, groups and individuals. It is the latter type of theories that is of interest in the current study.

The main focus of theories at the individual level is on the fundamental processes that can explain and predict the ways in which humans make decisions across a variety of different situations. It appears that in this area roughly four approaches have been adopted, which initially developed more or less along side each other with relatively little interaction. These four approaches may be termed: (a) decision theory approach, (b) policy-capturing approach, (c) information-processing approach and (d) decisional style approach.

Decision theory approach

The decision theory approach includes theories that share a preoccupation with a *rational* model of decision making. The origin of this approach can be found in economics (Hammond, McClelland & Mumpower, 1980). Expected Utility Theory (von Neumann & Morgenstern, 1947) was one of the early attempts to construct a theory about decision making. From an economic perspective, people are believed to make rational decisions, basing their choices on a complete cost-benefit analysis of the alternatives, estimating the likelihood of the occurrence of events (probabilities) and the value those events would have for them (utilities). It soon became apparent however, that most human judgment and decision making processes do not follow the optimum and rational model prescribed by the Expected Utility Theory. This realization resulted in several different developments. One group of researchers focused their efforts on optimizing logical and mathematical decision models that can assist decision makers in making more rational choices. An example of this prescriptive approach is the work of Keeney and Raiffa (1976).

A second approach that followed from the finding that humans fall short of being rational in their decision making, was instigated by the work of Edwards (1954), who introduced the Subjective Utility Theory. The aim of Edwards' work was to *describe* how humans' actual decision making compares with the optimal rational model. He used the Bayesian decision model, with an emphasis on the estimation of probabilities and utilities, as the ideal model and tried to describe behavior in terms of deviations from this model. The majority of the research that followed the publication of Edwards' paper consisted of laboratory experiments, designed to study how closely human problem solving approximates the statistical process prescribed by the Bayesian theorem (Hammond et al., 1980). This approach has also become known as Behavioral Decision Theory (Edwards, 1961).

The value of the rational, Bayesian decision model as a normative model was first criticized by Simon (1955), who contended that decision makers are not always after optimum solutions, but often choose solutions that are good enough. According to Simon people look for options that satisfy their aspiration level, a level which is usually lower than that required by a totally rational cost-benefit analysis. This phenomenon of looking for satisfactory solutions was termed *satisficing*. Simon also introduced the term *bounded rationality* to refer to the fact that humans may be rational in their decision making, but only up to a point.

The idea of bounded rationality stimulated the work of Tversky and Kahneman (1974, 1981), who focused their attention on exploring the boundaries of human rationality and who tried to identify the reasons for this 'imperfection'. They did this by concentrating on the manner in which people perceive and evaluate probability information. The theory they generated about decision making is called Prospect Theory (Kahneman & Tversky, 1979). According to this theory, the value of an option or alternative is determined by two components: a probability-weighting function and a value function. The probability-weighting function reflects the fact that people often do not use the objective probability of an event in their decision making, but instead tend to over- or under-estimate this probability as a result of various cognitive mechanisms. The value function incorporates the notion that people are influenced by the direction of the gambles that they take, that is, they tend to take risks if the probability of a loss (in money or wellbeing) is high, but avoid risks if the probability of a gain is high.

Tversky and Kahneman also identified a number of heuristics (Kahneman, Slovic & Tversky, 1982; Tversky & Kahneman, 1985), that is, judgment effects that influence people's probability assessments or frequency estimates. Example are the availability heuristic, representativeness heuristic, confirmation heuristic and anchoring heuristic. Furthermore, they emphasized (Tversky & Kahneman, 1985) the importance of a *decision frame* as an explanatory concept in understanding people's choices. A decision frame refers to the way in which the decision maker perceives the actions, consequences and contingencies associated with a particular choice. The way in which a problem is presented (e.g., in terms of gains or in terms of losses), the perception of the certainty of an outcome and the relation of an outcome to the outcome that would be regarded as neutral, are all examples of framing effects that tend to influence a person's choice in a decision task.

Prospect theory studies have produced a number of interesting peculiarities about human decision behavior in situations where alternatives have to be compared on the basis of estimated probabilities and utilities. The research in this area has certainly shown that there are many factors, both in the decision task itself and in the cognitive processing of the decision makers, that make it unlikely for people to behave in accordance with the rational rules of the expected utility model prescribed by economically oriented decision theorists.

A major point of interest of Tversky and Kahneman's work has been the influence of task and environmental characteristics that govern people's decision behavior in situations of uncertainty. Other researchers have directed their attention to the underlying cognitive processes of how individuals utilize, combine and process information in order to come to a judgment or decision. Within this focus two approaches can be distinguished, each with a different emphasis, i.e. policy capturing and information-processing.

Policy-capturing approach

The policy-capturing approach is characterized by an attempt to capture the strategies (often called 'policies') that people use in integrating information in the process of making a decision, and to describe these strategies in the form of a mathematical model, usually a (multi-)linear model as used in multiple regression or analysis of variance (ANOVA). This approach has also been called 'regression approach' (Slovic & Lichtenstein, 1971) and 'structural modelling approach' (Ford, Schmitt, Schechtman, Hults & Doherty, 1989). The main interest of researchers utilizing this approach has been to understand the way in which people weight and combine the information that is available to them in coming to a judgment or a decision, and to predict future decisions on the basis of the 'policy' captured. A few different streams of research can be distinguished within this approach.

1) *Social Judgment Theory*

One stream is based on the work of Egon Brunswik (1934, 1952) and his theory of 'probabilistic functionalism'. This theory emphasizes the ambiguity that surrounds people in their daily environment. Brunswik noted that people do not have direct access to the state of objects and events in their surroundings, but have to infer this state from what they perceive (cues). The nature of the relationship between people and their environment is therefore probabilistic. Brunswik developed the *lens model* to represent this probabilistic relationship. In this model a distinction is made between the actual and the perceived relationship of observable cues in the environment with some 'distal variable' of interest. The perceived relationship entails the cognitive representation of connection between observable cues and the distal variable of interest in the mind of the decision maker. The accuracy of a person's judgment about the state of a distal variable in comparison to the actual state of this variable is called 'achievement'. The lens model has become a valuable tool in the study of human judgment within this stream. Since the probabilistic nature of the environment would best be captured by a statistical model, Brunswik advocated the statistical approach to the study of both the actual task and the cognitive representation of that task. Originally, the lens model's main application was to the study of perceptional judgments in the physical environment, because this was where Brunswik's interests lay. It was Hammond (1955) who first noted that the lens model could be applied to the study of general human judgment, because it offered a framework to investigate the effect of the environment on the accuracy of human judgments. In 1955, Hammond used the lens model to study clinical judgments. Since then, this model has been systematically applied, not only to the study of achievement types of judgments, but also to the study of learning and to the study of judgment in social circumstances (Brehmer, 1988). This stream has become known as Social Judgment Theory (SJT) (Brehmer & Joyce, 1988; Hammond, Stewart, Brehmer & Steinmann, 1975). A particular interest of the SJT approach is the representation of real life situations, while it is also concerned with cue-learning and feedback.

2) *Linear and non-linear modelling*

In situations where the actual state of affairs of the distal variable can not be known, the lens model can only be applied for one half (the cognitive system). In those cases the resulting model resembles the model used in another stream of research, one that is less interested in achievement but mainly focuses on the way in which people weight relevant factors in their judgments. Following a paper by Hoffman (1960) a number of researchers concentrated on describing and predicting the idiosyncratic judgment policies of individuals in a wide variety of tasks. The mathematical model used most to describe and predict the judgment policies (in this stream as well as in SJT studies) is the linear model, as derived from (multiple) linear regression analysis. In their review of studies using the regression approach, Slovic and Lichtenstein (1971) concluded that the linear model was very effective in *predicting* human judgments. However, despite this high predictive value, the linear model has been criticized because it would not be descriptively accurate and would not reveal much of the true nature of judgment (Brehmer & Brehmer, 1988; Elstein et al, 1978). Some researchers have therefore tried to capture nonlinear policies, either by applying ANOVA techniques instead of regression analyses (Hoffman, Slovic & Rorer, 1968; Rorer, Hoffman, Dickman & Slovic, 1967; Slovic, 1969), or by testing a specific nonlinear model (Brannick & Brannick, 1989; Einhorn, 1970). Although these studies generally found that nonlinear models did not predict choices or judgments better than linear models, they did indicate that nonlinear policies indeed occur (Slovic & Lichtenstein, 1971), and that sometimes non-linear models do explain more variance (Brannick & Brannick, 1989).

3) *Information Integration Theory and Conjoint Analysis*

Another stream of policy-capturing studies follows the work of Anderson (1974, 1981, 1982) on functional measurement and Information Integration Theory. This theory originates in psychophysics (Hammond et al., 1980) and is mainly concerned with finding mathematical models that represent the way in which people weight and integrate stimulus information to produce a response. According to Information Integration Theory, which has been applied to a wide number of cognitive tasks, stimulus integration can often be described by simple algebraic rules, such as adding, multiplying and averaging. Anderson therefore speaks of 'cognitive algebra'. One procedure relying heavily on Information Integration Theory is "Metric Conjoint Analysis", described by Louviere (1988). Individuals' decision policies are captured by estimating weights or 'attribute utilities' on the basis of their responses on Likert type scales to different 'profiles' of cases or scenarios, representing different combinations of 'cues' or decision attributes. This procedure utilizes a multilinear polynomial mathematical model to estimate the relative importance of the cues as weighed in a decision maker's choices. The multi-linear model includes the possibility to estimate all possible interaction effects, and accommodates non-linear models as well. The conjoint method as described by Louviere employs either multiple regression with effect coding or ANOVA to analyze the data.

While researchers following the policy-capturing approach tend to start off with the information that is available to decision makers and focus on how this information is weighed and integrated in order to arrive at the judgment or choice, other researchers prefer to start off with the decision makers and focus on the processes that they employ in order to arrive at a decision. This approach is known as process tracing or information processing.

Information-processing approach

The information-processing or process-tracing approach to decision making has been strongly influenced by the work on problem solving of Newell and Simon. Pioneers in the area of information processing, they published a volume in 1972, reviewing most of the research they had carried out during the 1950's and 1960's and organizing it within the framework of the 'Theory of human problem solving' (Newell & Simon, 1972). This theory conceptualizes the problem-solving man as an information processor, characterized by an active processing system, sensory input and motoric output systems, a long term memory of unlimited capacity, a short term memory of limited capacity and an extended memory consisting of the immediate visible field. The theory assumes that people process information in a sequential and symbolic way. Newell and Simon viewed man as a flexible being, capable of adapting to a wide variety of environments, and drew a strong parallel between human information-processing capacity and the computer. They emphasized the importance of knowing the way in which a problem is represented in someone's mind (called 'problem space') for understanding this person's problem-solving behavior. They therefore advocated the use of verbal data, obtained while thinking aloud during the execution of a task. The analysis of verbal protocols as a technique for obtaining information about people's information processing has consequently become a hallmark of the research following this approach. Payne (1976) was the first to recognize that this technique could also be applied more specifically to the study of human decision making, providing insight into the information processing that leads to a particular decision. As was the case with the policy-capturing approach, several 'streams' of research can also be distinguished within the information-processing approach.

1) *Computer modelling/simulation*

One stream has followed closely the work of Newell and Simon, whose major goal has been to extract the sequential information-processing model from the decision maker's verbal data and to transform it into a computer algorithm, which consequently serves as a tool for defining and refining theory and for formulating testable predictions. Developing flow-chart models that can be transformed into computer programs is still a strong focus of information-processing research (Simon, 1990).

2) *Information search and integration*

A great number of studies have been aimed at establishing, like in the policy-capturing studies, whether people use information in a linear or non-linear fashion (Ford et al., 1989). In these studies two types of designs have been used, thinking aloud and information display boards. Information display boards, which can be of a mechanical or computerized nature, present subjects with information on the alternatives and their attributes and monitor the information search process of the subjects. The verbal reports resulting from subjects' thinking aloud during decision making provide information on both the way in which cues are examined and on the way in which the information provided by the cues is integrated in the process of making a decision. The information display board method provides more information on the search process, including pattern, content and depth of search, but less on the actual integration of information, although the integration may be inferred from the search pattern.

3) *Search for dominance*

A relatively new approach to information-processing was proposed by Montgomery (1989a, 1989b). Using thinking aloud experiments as a basis, he advanced a theory suggesting that the decision process is characterized by the search for a dominant alternative rather than only being governed by a number of decision rules. The theory proposed that decision makers attempt to restructure their initial representation of the decision problem in such a way that one alternative can be seen as dominant, and hence will emerge as the obvious choice. This process starts with an editing phase, in which a decision maker selects alternatives and attributes to include in his or her mental representation of the problem; in the next phase the decision maker searches for an alternative that has a reasonable chance to be seen as dominant over the others (the 'promising alternative'); this alternative is subsequently tested to see if it has any disadvantages in comparison to other alternatives, or in comparison to some absolute standard. If it does not and it can be seen as 'dominant', this alternative is chosen; if it does, the dominance structure is said to be violated, and the decision maker will likely engage in various cognitive operations to try and restructure the given information in such a way that the selected alternative is still seen as dominant. This can be done by using simplification (e.g. non-compensatory decision rules) or elaboration strategies. These may involve de-emphasizing a given disadvantage or counterbalancing it by relating it to an advantage, or reinforcing either the advantages of the promising alternative or the disadvantages of other alternatives. If these mental operations do not result in sufficient dominancy of the promising alternative, another alternative may be selected and tested, or the decision may be postponed until more information is available.

This theory suggests that information integration is not an essential element of decision making, but that decision making is mainly a matter of deciding for the dominant alternative. This would mean that choices do not follow from an examination and integration of the available information, but from the generation and selection of an alternative and a testing of whether this alternative is tenable against practical, motivational or moral standards important to the decision maker. The 'search for dominance' theory is quite new and has not been thoroughly tested yet, however, it does seem promising, especially with regard to more everyday decisions, although it is primarily based on laboratory studies. It provides interesting perspectives for the study of decision making, for example one may ask what makes a particular alternative attractive to certain decision makers or what types of standards are chosen for the evaluation of an alternative.

4) *Applied interests*

A fourth stream of research within the information-processing approach involves studies carried out for applied purposes. Elstein et al. (1978) for instance, used the thinking aloud method to obtain information about how novice and expert physicians arrive at a diagnosis, with the goal of possibly improving the reasoning and decision making of medical students. Some studies on teacher decision making have also used the information-processing approach with the purpose of identifying possible areas for improving the practice of teaching (Shavelson & Stern, 1981). Rather than applying traditional analyses techniques that would allow for the creation of flow charts or identification of search or information integration strategies, studies in the applied area have also used different analyses of the verbal protocols, such as traditional content analysis (Peterson, Marx & Clark, 1978), descriptive content analysis (Butcher & Scofield, 1984), grounded theory analysis (Parker & Gehrke, 1986) or a phenomenological analysis (Aanstoos, 1986). Diversions from Newell and Simon's proposition that verbal protocols need to be obtained during the execution of the task have also been found, mainly in the form of 'stimulated recall' designs, used in studies where it was impossible to have the subject verbalize his or her thoughts during the actual task (e.g. interactive teaching decisions, MacKay & Marland, 1980). In those cases the effort to increase ecological validity by studying a decision maker in a real life situation led to the necessity to sacrifice some of the accuracy of the information-processing strategies assessed.

Decisional style approach

A fourth approach that can be found in the literature about decision making concerns the influence of personal attributes on the way decisions are being made. The work in this area is not as extensive as is the case with the three above-mentioned approaches, possibly due to the fact that many theorists within these approaches emphasize task and environment characteristics as the major contributors to variations in decision making. However, some theories have been developed suggesting that people's decision making is influenced by various personal styles. These styles have been defined at cognitive, trait and behavioral levels.

Cognitive style theories distinguish people according to the way in which they customarily collect, process and integrate information when making a decision. Driver and Mock (1975) outlined four cognitive styles: decisive, flexible, hierarchic and integrative. These four styles form combinations of the extremes on two dimensions: the amount of information used (minimal or extensive) and the focus of the solution (one or a multitude of possible solutions). This theory has not been thoroughly tested however. Wright and Phillips (1984, cited in Wright, 1985) distinguished between probabilistic and non-probabilistic decision styles, but did not find much support for the existence of these styles. A cognitive style theory that has received more substantive attention is the Type theory of Catherine Myers and Isabel Myers Briggs (Myers, 1980; Myers & McCaulley, 1985). This theory focuses less on the tendency to apply certain rules and not others, and more on basic general preferences affecting the nature of the decision-making process. The theory, which is based on Jung's ideas on typology, differentiates people according to their preferred ways of collecting information from their environment (through direct sensing or more indirect intuiting), and on their preferred way of coming to conclusions and making decisions (through analytical, logical and impersonally oriented 'thinking' or through less rational but more person oriented 'feeling'). The theory also distinguishes between a judgmental style representing a tendency to come to conclusions on the basis of the available information, with no need to collect additional data, and a perceptional style reflecting a tendency to stay open to new information and to delay decisions. Research based on this theory is growing, aided by the existence of a fairly well validated instrument to measure the four dimensions, the Myers Briggs Type Indicator (MBTI; Myers & McCaulley, 1985). Researchers using the MBTI tend to focus on decision making in applied settings such as medicine (Friedman & Slatt, 1988), business (Schweiger & Jago, 1982) and teaching (Kagan & Smith, 1988). Few attempts have been made to study the relationship between decisional style as defined by MBTI concepts and decision strategies, policies or processes as outlined in the above-mentioned approaches.

Decisional styles influenced by personality traits were discussed by Kozielecki (1981). He concluded that there are indications that several traits do to some extent affect people's tendency to make risky or conservative choices. He mentioned specifically the achievement motive, the motive to avoid failure, the need for aggression and dominance, and the need for stimulation.

Research focusing on decisional style at a behavioral level has been developed in the organizational setting and is usually concerned with the behavior of leaders or managers, as part of their leadership style. Gordon (1986a) summarized a number of the decision-making styles that have been suggested in the leadership literature, for instance, autocratic, democratic and laissez-faire styles (Lewin, 1947), autocratic, participative and delegative styles (Vroom & Yetton, 1973), decisive, hierarchic, integrative and flexible styles (Hunsaker & Alessandra, 1980). Decision style in this respect is mainly concerned with the amount of input that leaders seek from subordinates when making group-related decisions. A typical objective of using this approach has been to find the effect of a particular style on productivity and job-satisfaction of subordinates.

Many of the authors addressing the role of individual characteristics in decision making acknowledge that the contribution of personal style attributes to explaining decision behavior is relatively small (Gordon, 1986a; Kozielecki, 1981; Wright, 1985). An interactionist approach is, therefore, often advocated, emphasizing that decision behavior results from an interaction of person, task and situation. This approach is, for instance, reflected in Vroom and Yetton's (1973) normative contingency model of participative decision making, which was adapted by Chelladurai and Haggerty (1978) to study decision-making style in coaches. Magnusson (1976), one of the first proponents of the interactionism paradigm, noted that this paradigm is based on the assumption that people select, interpret and treat information from the situation and that it is the constitution of the individual's mediating system, in terms of structure, content and motivation, that determines the outcome of this process. It is exactly this mediating system, in particular the content, that is of interest to the process-tracing and policy-capturing researchers.

Cognitive decision strategies

Although their methods of inferring the nature of the strategy that is used are quite different, both the policy-capturing and the process-tracing approach show an interest in the way in which individuals use information in the act of deciding, that is, their cognitive strategies (sometimes also referred to as decision rules). These strategies are generally distinguished into compensatory and noncompensatory, or linear and nonlinear strategies (Billings and Marcus, 1983; Ford et al., 1989; Payne, 1976; Svenson, 1979).

Compensatory strategies of information integration tend to be more cognitively complex than non-compensatory strategies. A strategy is said to be compensatory when there is a trade-off between a high value on one attribute and a low value on another attribute. In process-tracing studies, the use of a compensatory strategy is inferred when a constant number of cues is searched and used for each alternative. In policy-capturing studies, compensatory strategies are represented by additive mathematical models, which are often also linear in nature (Brannick and Brannick, 1989). Examples of such models are the additive or linear model, as used in linear regression analysis, the additive difference model and the subjective expected utility model (Ford et al., 1989; Svenson, 1979).

Noncompensatory strategies are aimed at simplifying the complexity of the problem and reducing the cognitive demands on the individual. Examples of noncompensatory strategies are conjunctive strategies, disjunctive strategies, lexicographic strategies and elimination-by-aspect strategies (Ford et al., 1989; Svenson, 1979). In process-tracing studies, noncompensatory strategies are inferred from search patterns in which a variable number of cues is examined and/or used for each alternative. After reviewing a large number of process-tracing studies, Ford et al. (1989) concluded that non-compensatory strategies were widely used in problem-solving tasks, with the conjunctive strategy as the dominant strategy. Compensatory strategies were found in tasks where the number of alternatives and attributes or dimensions was small, or after elimination of a number of task stimuli. Assessment of the use of noncompensatory strategies in policy-capturing research is hampered by various sorts of problems. In order to statistically test a specific noncompensatory strategy, an accurate mathematical model representing this strategy is needed. For some of the noncompensatory strategies identified in process-tracing studies, no such model is available (e.g. the lexicographic strategy, Einhorn, 1970). Even where there are mathematical models, these are still approximations, subject to criticism and revision. In 1970 for example, Einhorn proposed two models to represent conjunctive and disjunctive strategies, but improvements for those models have since been suggested by Goldberg (1971) and Brannick and Brannick (1989). Another problem, raised by Brehmer and Brehmer (1988), is that, although one may find, in testing the linear model against a specific nonlinear model, that the nonlinear model predicts the data better than the linear model, this does not mean that the nonlinear model is in fact the correct model. The best guarantee for the correctness of a specific nonlinear model would be either a test of all plausible nonlinear models, or some theoretical or empirical indication that the decision maker used or should have used this particular nonlinear strategy. Reviews of policy-capturing studies using the regression approach have generally yielded the conclusion that in the majority of the studies conducted so far, the linear model accounts for most of the variance (Brehmer and Brehmer, 1988; Slovic and Lichtenstein, 1971). In each review however, it was recognized that nonlinear decision strategies do occur, even though they may not add significantly to the prediction of judgments or decisions.

Not many researchers have attempted to combine both the policy-capturing and process-tracing approach in one study and compare the outcomes. Two studies in which the approaches were combined were conducted by Einhorn, Kleinmuntz and Kleinmuntz (1979) and Billings and Marcus (1983). The general tenor of these studies was that the two approaches are complementary. Einhorn et al. concluded that each approach offers a different type of insight, both valuable, and Billings and Marcus suggested that the approaches each capture a different stage of the decision- making process. According to Billings and Marcus (1983), who compared an ANOVA approach with an information board approach, both these methods measure non-compensatory decision strategies, but the latter emphasizes the information-acquisition stage of the decision process whereas the former is concerned with the information-integration stage of this process. Einhorn et al. suggested that the regression-based policy-capturing approach is useful for estimating the relative importance of a particular cue in the judgment or decision and, because of its relative convenience in studying a larger number of subjects, for estimating the systematic and error variances in a judgment. It would not however, provide insight into how information is searched, how cues are chosen and which cues are attended to. For this type of insight the information-processing approach would be useful. Overall, it appears that process-tracing studies have yielded more insight into the use of noncompensatory strategies than policy-capturing studies. Ford et al. (1989) concluded that process-tracing studies provide different types of information than policy-capturing studies, and suggested that the former offer a better understanding of the actual processes that decision makers use in arriving at a decision. They added that a protocol analysis may indicate the type of non-linear effect that might be included in a regression analysis.

Coaches' decision making

Research on the decision making of coaches has thus far mainly focused on decision-making style. Chelladurai and Haggerty (1978) introduced a normative model for coaches' decision making, distinguishing autocratic, participative and delegative decision styles as well as seven problem attributes (e.g. time pressure, problem complexity, information location) that would indicate which decision style would be best for which type of problem situation. On the basis of their own (Chelladurai & Arnott, 1985) and Gordon's (1988) studies using this model, Chelladurai, Haggerty and Baxter (1989) concluded that the delegative style is not particularly viable in the context of team sports. They therefore changed and refined the decisional styles, using the categories originally proposed by Vroom and Yetton (1973), resulting in two forms of autocratic styles, two forms of consultative styles and the above-mentioned participative style, now called group decision-making style. The two autocratic styles referred to situations in which the coach makes the decision by either (1) using the information available to him or her at the time or (2) obtaining the necessary information from relevant athletes. The consultive styles consisted of the coach making the decision after consulting with either (1) athletes individually or (2) athletes as a group, with the purpose of generating or evaluating solutions. In the group decision-making style the group, including the coach as a member makes the decision. Because acceptance of coaches' decisions by their athletes is important (Chelladurai, 1986) a major area of interest in the study of this model has been the correspondence between the coaches' own preferred or perceived decision making style in particular situations, and the style preferred by the athletes for these situations. Both Gordon (1988) and Chelladurai et al. (1989) found, for soccer and basketball respectively, that athletes tend to prefer the coach (rather than the players) to be responsible for the decision making. In their 1989 study, Chelladurai et al. found that the autocratic style in which the coach solves the problem without contacting the athletes was preferred most, followed by consultation with the group; consultation with individual athletes was preferred least. Considerable agreement was generally found among the coaches and athletes in their decision style choices, although coaches tended to prefer the autocratic style slightly more than the athletes. Although 15 years have passed since the introduction of the decisional style model by Chelladurai and Haggerty (1978), only three studies have thus far examined the validity of this model, and they have all involved team sports and university level athletes. This suggests that the generalizability of the results at this stage is rather limited.

Whereas research on coaches' decision making style has been scanty, studies approaching coaches' decision making from different theoretical perspectives have been even more scarce. Two recent studies investigated some of the factors determining specific coaching decisions, using policy-capturing types of approaches. Flint and Weiss (1992) examined the effect of player status and game situation on basketball coaches' decisions to return an injured player to the game, and Duke and Corlett (1992) studied the factors that would lead basketball coaches to ask for a time out. Both studies were based on mailed questionnaires.

It can be concluded that studies of coaches' decision making have been limited, both in scope and in numbers. The few studies that have been conducted have mostly concentrated on decision making style, and all studies have involved team sport coaches, particularly basketball. It would appear that coaches' decision making research could benefit from adopting some of the approaches developed in other areas of decision making research, to illuminate some other aspects of coaches' decision making, for example the factors that influence inter-individual differences between coaches in decision outcomes or what coaches take into account when making decisions. In addition, expansion to individual sports as well as other types of team sports would broaden the spectrum of this area of research.

Terminology

The terminology used to refer to the different types of tasks and their elements is sometimes confusing. The terms decision, judgment, problem solving and occasionally reasoning, have all been used to refer to the task of the subjects under study. Some authors make a clear distinction between the terms (e.g. Campbell, 1988; Hammond et al., 1980), others do not (e.g. Kozielecki, 1981; Slovic & Lichtenstein, 1971). It would seem that *decision making* is a process in which information is selected, evaluated and integrated in order to come to a *choice*, i.e. a decision. *Judgment* implicates the appraisal of information on some evaluative dimension, but does not involve choice. Although judgments are not necessary to make a decision, oftentimes judgments will be part of a decision process, especially when the decision is complex. The terms 'problem task' and 'decision task' can be regarded as synonyms, the term 'judgment task' is specific to the situation in which the person is asked to evaluate a number of issues on one or more dimensions, but does not need to make a choice. *Reasoning* is a mental activity that is generally part of any problem-solving or decision-making process that does not require instantaneous reactions but allows the individual some time to deliberate about a choice or solution.

Summary of decision-making theories

The literature on individual decision making can be broadly classified into four approaches: (a) the decision theory approach in which a rational decision model forms the point of departure for studies aiming to describe and explain how and why people deviate from making rational decisions, (b) the policy-capturing approach in which regression and ANOVA models are used to try to capture decision-makers' strategies of weighing and integrating information in the course of making a decision, (c) the process-tracing approach in which verbal protocols, resulting from subjects thinking aloud while solving a problem, are analyzed with respect to the information search and integration strategies used, and (d) the decisional style approach, in which individual characteristics are used to explain variances in decision behavior, although it is commonly recognized that these variances are best explained by an interaction of individual and situational characteristics. Studies on coaches' decision making have been sparse, and the ones that have been conducted have primarily used the decisional style approach. With respect to the study of the coaches' decision making about the participation of an injured athlete in competition, any of the four above-mentioned approaches would probably yield interesting information. In the current study however, the primary interest concerns the cognitive aspects involved in this type of decision. Considering this emphasis, the policy-capturing and information-processing approaches seem to be the most appropriate.

From the literature comparing the policy-capturing and process-tracing approaches it can be concluded that these two approaches may yield complementary information on the cognitive strategies that people use when making a decision. Verbal protocols, which are regarded as relatively accurate recordings of people's information-processing activity during decision making provide information about process characteristics; for instance, which cues are examined and in what order, the application of criteria to various solutions, and whether the strategies used follow more complex or simplifying decision rules. When using qualitative data analyses techniques, this approach is also suitable for the purpose of exploration or generation of theory. Regression and ANOVA methods on the other hand, as used in policy-capturing studies, may provide insight into the way in which information is integrated and shed light on the relative contribution of particular informational cues. Because it is generally easier to study a greater number of subjects using the policy-capturing approach, this approach also lends itself better for estimating the variances between judges and for statistically relating these variances to other relevant variables.

Task types and characteristics

A topic that is not always addressed when theories or research results are compared and discussed, is that a wide variety exists among decision types, based on differences in nature, structure and importance. These differences are to some degree reflected in the various decision tasks that have been used in decision-making research, and in the various characterizations of decision tasks provided in the literature. It is important to be aware of differences in task structure and characteristics, because there is evidence that decision makers adapt their strategies to the characteristics of the decision task and its context (Payne, 1982; Payne, Bettman & Johnson, 1988).

Different types of tasks

The decision theory approach, with its background in economics, has focused on decision types that require processing of probabilistic and often numerical information, like many business and management decisions. The majority of the studies within this approach have used laboratory tasks, asking subjects to estimate the absolute or relative probability of the occurrence of a particular event, or to make a choice between various gambles. Usually, specific task conditions are manipulated in order to see what the effects of different circumstances, problem formulations or conditions are on the accuracy or direction of the probability estimate. These decision tasks therefore are generally of a quantitative nature.

Two types of tasks can be found in policy-capturing research, judgment tasks and decision or choice tasks. Subjects are typically presented with descriptions of persons or objects and asked to either (a) rate each case description on some dimension (judgement tasks, e.g. profiles of MMPI scores presented to psychologists who are asked to rate each patients' degree of adjustment or maladjustment, Einhorn et al., 1979), or (b) make a decision on the basis of an (implicit) evaluation of each case description (decision or choice tasks). The latter tasks also come in two versions. On the one hand, there are decisions that imply a choice of one of the cases described (e.g. product descriptions of different brands presented to potential consumers who are asked which brand they would buy, Bettman & Park, 1980). On the other hand, there are decisions that are 'behavioral' in nature, referring to the actions one would undertake on the basis of each case description (e.g. patient profiles presented to physicians who are asked to indicate the likelihood that they will prescribe a certain type of medication, Holzman et al., 1984).

Traditional information-processing tasks such as the ones used by Newell and Simon (1972) tend to be of a problem-solving nature, i.e. there is a correct or optimal solution and the subject has to find a way of arriving at that solution (e.g. crossword puzzles, finding the combination of a safe, translating a German article into English, crypt-arithmetic problems, chess, etc.). In studies focusing on information search and integration, using thinking aloud and/or information display board designs, many of the tasks are similar to the ones in policy-capturing studies. Subjects are asked to either provide a judgment of each case description, or to indicate a choice or behavioral decision on the basis of an evaluation of each description.

Task characteristics

Decision tasks have been characterized in various ways. Some authors have described tasks according to the mental operations involved in executing the task. Kahneman and Tversky (1979) for instance, proposed two phases, one in which the problem is 'edited' into a simpler representation (editing phase) and one in which the resulting information is evaluated according to an expected utility rule (evaluation phase). A three-phase model has also been suggested (Einhorn & Hogarth, 1981; Payne, 1982), consisting of an information-acquisition, evaluation/ action and a feedback/learning stage. Carroll and Johnson (1990) described decision making as a four-component process, including first the identification of a choice or judgment to be made, second and third the gathering and evaluation of information about alternatives and lastly making a selection from among the alternatives. Montgomery's (1989a) 'search for dominance' model also outlined decision making as a four-phase task, in which information is first pre-edited through selecting and evaluating attributes, after which a promising alternative is chosen which is subsequently tested against some absolute criterion or against another alternative; the fourth phase is added if the promising alternative is not found to be dominant and consists of restructuring the information in such a way that a dominance structure is achieved.

Other characterizations that have been used concern questions like whether additional information can or needs to be sought (*dynamic* versus *static* tasks, Kozielecki, 1981), or whether probability estimates are required. Many tasks do involve some form of probability estimation, since we live in a world in which actions often do not lead directly to desired consequences and in which the occurrence of most events is probabilistic. These tasks are called risky tasks (Kozielecki, 1981). Another aspect that has been distinguished is the degree to which alternative actions are well-defined, obvious or belong to an easily accessible behavioral repertoire. Kozielecki differentiated between *closed* and *open* decision tasks. In closed tasks, the available actions are relatively well-defined, some formalized process may be used to solve the problem, and the goodness of the chosen solution can often be checked against an empirical criterion. Open decision tasks on the other hand, are usually new and unconventional and require the decision maker to generate a set of alternatives and formulate hypotheses about their likely consequences before a decision can be made. Evaluation of the chosen solution is often subjective. Open decision problems are also called 'ill-defined' problems. It is plausible that decision tasks in everyday life fall on a continuum ranging from extremely closed to extremely open decisions.

Another task characteristic that is often mentioned as important is complexity. Some of the more simple definitions of complexity have involved the number of alternatives and the number of attributes (Payne, 1976), or sometimes time pressure (Payne, Bettman & Johnson, 1988). A more complicated definition was given by Campbell (1988), who suggested that task complexity is a function of the cognitive demands placed on the decision maker. Any objective characteristic of a task that increases the information load, information diversity or rate of information change is assumed to increase the cognitive demands on the decision maker and therefore to contribute to task complexity. Campbell identified four fundamental task components that may act as sources of complexity, i.e. (a) multiple potential ways (paths) to arrive at a desired end-state, (b) multiple desired end-states to be attained, (c) conflicting interdependence among paths to multiple outcomes, and (d) uncertain or probabilistic links among paths and outcomes.

A final aspect that may be considered under task characteristics is the composition and content of the decision problem. There may be various sources of information that co-determine the content of the problem. These sources of input information are often referred to as 'cues', because they inform the decision maker about the level of involvement of factors relevant to the decision. In medical decisions for example, a cue may be formed by the degree of severity of a specific symptom (e.g. a high, moderate or low fever, or the amount of swelling present after an ankle sprain). These cues, in a sense, are the parameters of the decision problem. They are also sometimes referred to as attributes or premises. In laboratory studies, they contain the information that describes the decision problem to the subjects. In everyday life cues are probably less clearly distinguished and more complex.

Summary of task types and characteristics

Decisions come in a variety of forms and structures, and have been distinguished according to several different characteristics, such as complexity, closed- versus openness, degree of uncertainty (probability estimation), and content. Within the policy-capturing and information-processing approaches two types of task structures have been used. In one the decision maker is asked to evaluate a number of case descriptions and judge each case on some dimension, in the other, the decision maker is asked to make a choice on the basis of an (implicit) evaluation of each case description. This choice may entail a selection of one of the cases, or specific actions to be carried out for each case. It is the latter structure that is involved in the decision task of coaches regarding the participation of an injured athlete in an upcoming competition.

Decision making in everyday life

A major goal of decision-making research has been to generate knowledge and construct nomothetic theories about human decision-making and information-processing phenomena. To this end many researchers have employed laboratory tasks, studying decision-making rules and strategies. Kozielecki (1981) reported that psychologists started out with relatively simple designs, often using only two alternatives (mostly in the form of gambles or technical problems), with the outcome expressed in monetary gains or losses. Then, through the years, aided by more sophisticated methodologies, the problems studied became increasingly more complex and more representative of real life issues. However, although this process possibly enhanced the generalizability of the results to real life decision-making situations, the question remains how the theories developed on the basis of laboratory studies relate to actual real life or everyday decision making situations. A related question pertains to how applicable the methods used in controlled laboratory situations are to the study of real life decision problems.

Generally, the purpose of researchers studying a specific real life decision problem has not been to generate nomothetic knowledge about human decision making phenomena in general, but to gain an understanding of the particular problem under investigation (called 'isonomic' or 'isotypical' theorizing (van Strien, 1986)), usually with the secondary purpose of finding ways to improve decision making in one way or another. For example, many studies investigating the cognitive processes involved in making particular decisions have been carried out for the purpose of developing decision aids (e.g. computer programs that simulate the decision) or teaching methods for optimal decision making. The latter may be done on the basis of a study of superior decision makers, or on the basis of a comparison of the information processed by novice and experienced decision makers. Other practical purposes of decision-making researchers lie in supporting the development of a policy or a marketing strategy. Studies carried out for this type of purpose are usually aimed at identifying the distinctive situational and personal factors that determine a particular decision outcome. Examples are risk decisions (e.g. building a nuclear power plant, investing money), consumer decisions (e.g. buying a particular product) or moral decisions (e.g. regarding euthanasia, abortion).

While studying specific everyday problems, one might expect that the nomothetic theories of human decision making would provide useful general knowledge to draw from. Van Strien (1986) suggested that nomothetic theories may 'fertilize' the generation of theories of specific problems, although he did not explicate how this could happen. It has been argued, however, that the nomothetic theories developed in laboratory situations may not be straightforwardly applicable to real life situations, because the problem situations typically created in laboratory studies and those occurring in every day life differ in important respects (Galotti, 1989; Meacham & Emont, 1989; Rogoff, 1984). It has been pointed out for example that problems in laboratory experiments typically are solved within a limited time frame, do not require subjects to search their memory or consult outside resources to look for other relevant information and have no personal relevance to the person solving the problem. In everyday life on the other hand, there is often an extended time frame available to solve a problem or make a decision, and beyond having to search for relevant information, one frequently needs to decide which information is relevant in the first place. Furthermore, people in everyday life can generally consult with others in the process of solving a problem, a possibility which is not commonly part of a laboratory study. Lastly, problems in everyday life are "invaded by issues of value and responsibility" (Meacham & Emont, 1989, p.12), while laboratory problems are devoid of those issues. To what extent these differences affect the applicability of the nomothetic theories based on laboratory research to decision making in everyday problem situations is at this point hard to say. The results of laboratory studies have, for example, pointed to the existence of various heuristics and contingency effects, but it is currently not known to what extent and in what way these heuristics and effects determine actual decision making in everyday problem situations. Svenson (1979) suggested that people frequently rely on simplifying heuristics when making complex decisions in everyday life, such as 'deciding as the expert prescribes', 'as one did in a similar situation' or 'according to cultural or moral norms'. At a minimum one may expect that these laboratory-based theories are relevant but incomplete or simplified. However, it is also possible that they are irrelevant to everyday decision making, if the processes that govern everyday decision making turn out to be different than the ones that determine decision making in laboratory situations. Galotti (1989) implied that this might be the case when comparing formal and everyday reasoning, and Ebbesen and Konecni (1982) suggested that this was also the case with respect to bail-setting decisions within the justice system.

If laboratory studies limit the nature of real life problems, what are the alternatives to studying decision making problems that occur in real life? Galotti (1989), who described the differences between reasoning studied in laboratory situations and everyday reasoning did not address the issue of which methods and research designs are best suited to study everyday reasoning. Sinnott (1989) in her editorial note in a book addressing 'everyday problem solving', commented that the methods used in the studies described in the book were somewhat biased toward interviews, think aloud and standard-scenario methods. A variety of methods have been used so far in the study of specific everyday problems. A fairly widely developed practice has been the adoption and adaptation of laboratory or laboratory-like methods in which particular groups of subjects (e.g. physicians, teachers, social workers) are presented with hypothetical work-related decision problems (Dalgleish, 1988; Holzman et al., 1984; Shavelson, Cadwell & Izu, 1977). Other approaches have included laboratory and field studies in which everyday decision situations are simulated (e.g. actors playing patients in order to study physician's diagnostic decision making, Elstein et al., 1978), studies in which everyday decision situations are video-taped and replayed directly afterwards, using stimulated-recall methods to assess what the person was thinking when making the decision (e.g. inter-active decision making by teachers, MacKay & Marland, 1980; Shavelson & Stern, 1981), studies in which records of actual cases are used to infer decision policies (e.g. charts of hypertensive patients which are related to the test-ordering decisions of their physicians, Rovner, Rothert & Holmes, 1986), and case studies in which decision makers are studied in their natural setting (Clarkson, 1963; Aikenhead, 1984).

It would seem that each of these approaches has its own limitations, and will illuminate a certain aspect of the decision-making situation. It may be assumed that by applying various methods in different studies the understanding of the problem will deepen over time. However, for this to happen all aspects that play a role in a decision situation must have been incorporated in the studies. It seems warranted therefore, to use designs that allow for the exploration of the situation and emergence of relevant factors, especially in the early investigations of new problem situations. On the basis of the study of a great and varied number of real life decision situations a nomothetic theory of everyday decision making that can guide the study of specific real life decision problems may eventually be developed. Attempts to devise more general theories have been made in the area of teaching decisions (Shavelson & Stern, 1981) and medical diagnostic decisions (Elstein et al., 1978, 1990).

Summary of studying everyday decision making

Researchers interested in generating general human decision-making theory have mostly studied decision making in laboratory situations, often using relatively abstract or unfamiliar decision problems. Real-life decision problems have received more attention from researchers with an applied focus, interested in particular problem situations. These problems have been studied in various settings, both inside and outside laboratories, using distinct populations, hypothetical scenarios, records analysis, surveys, case studies, stimulated recall and simulation designs. It is not known at this point in time how the laboratory based nomothetic theories are related to the way in which people deal with real-life decision problems. More general theories about everyday decision making may emerge in an inductive fashion, on the basis of a substantial number of studies on specific real life decision problems. Researchers studying these problems need to pay attention particularly to the aspects that make everyday decision problems different from the problems typically studied in laboratory situations.

Decision variation

All four of the distinguished approaches to the study of decision making have emphasized the importance of task and context characteristics for understanding variations in human decision behavior. Task characteristics (e.g. complexity, open versus closedness) have been described before. This paragraph will address some of the context characteristics, as well as a number of individual variables that may be responsible for differences in decision-making behavior.

Situational characteristics

The features of a decision task are generally not only defined by the internal characteristics of a task, but also by environmental components. Examples of such components are time pressure and financial constraints (Beach & Mitchell, 1978; Payne, 1982), which tend to limit a decision maker's options, and aspects like the degree of reversibility of the decision, the magnitude of its consequences (both for the decision maker and for others), and the accountability of the decision maker for those consequences (Beach & Mitchell, 1978; Punj & Stewart, 1983). Specific to the coaching situation, Chelladurai and Haggerty (1978) suggested some situational attributes that would be relevant for decision making by coaches. They mentioned for instance the decision quality required, the location of relevant information, the necessity of group acceptance in order for the decision to be effective, the power of the coach and the degree of integration of the group. In a small exploratory study with university coaches Vergeer (1990) found that coaches themselves distinguished between decisions on the basis of factors like who is affected by the decision and in what way, and if there is external pressure, such as administrative demands.

Other situational characteristics include sociographic aspects that place the decision problem in a specific social and demographic context. For coaches such characteristics may involve the age and gender of the athletes, type of sport, the country, province or club, and level of competitive involvement.

Individual variables

Widespread differences between individuals in their decision-making have been reported consistently, both in the policy-capturing (Brehmer & Brehmer, 1988; Johnson & Doherty, 1983) and the process-tracing (Ford et al., 1989) literature. These differences have appeared in policy aspects like the number and types of cues used, organizing principles, weights, consistency and insight in one's own decision policies, as well as in information-processing aspects like depth, sequence and content of search patterns, time spent on searching and the use of linear or nonlinear strategies. Furthermore, these differences in strategy were reflected in the decision outcomes, i.e. in the actual decisions made. Although many personal and sociographic variables have been suggested as explanations for these inter-individual differences (e.g. familiarity with the task, experience, cognitive capacity, beliefs, skills to execute a specific behavioral alternative, perceived risk, conceptions, motivation, mood, socioeconomic status, gender, educational background), few researchers have attempted to actually measure these variables. Of the ones who did, some have found significant relationships with variances in strategies, others have not (Borko & Cadwell, 1982; Capon & Burke, 1980; Capon & Davis, 1984; Holzman et al., 1984; Jacoby, Chestnut & Fisher, 1978; Klayman, 1985; Peterson, Marx & Clark, 1978; Shavelson & Stern, 1981), leaving a somewhat equivocal picture of the roles of these personal variables.

The most frequently considered moderator variable used to explain inter-individual differences in decision-making strategies and outcomes has been experience with the task or with the content of the task. Ford et al. (1989) described how previous experience with the task did in some studies lead to more extensive or thorough search behavior, but did not affect search patterns in other studies. Wigton (1988), reviewing policy-capturing studies in medical decision making, noted that huge variations in policies were found both among novices and among experts, as well as in studies comparing these two groups. He did not mention possible moderator variables that might account for these within-group differences. Brehmer and Brehmer (1988) suggested that experience may not be a crucial mediating factor in itself, but that it is the way in which policies are learned from experience that differentiates decision makers. The work of Elstein et al. (1978) on medical problem solving, using a process-tracing approach, showed that the differences in decision making between experienced and novice physicians had to be linked to differences in the content, storage and use of their knowledge. As a consequence of these results, the focus of the research on medical problem solving has, during the last decade, shifted from strategy detection to memory organization, knowledge use and problem representation (Elstein et al., 1990).

Mental representation of the problem

The importance of the cognitive representation of a problem in the mind of the decision maker has been emphasized by such prominent theorists as Newell and Simon (1972) and Tversky and Kahneman (1981), who developed the concepts of 'problem space' and 'decision frame' respectively, and problem representation has been a relevant part of process-tracing research. Galotti (1989) suggested that the 'problem space' concept would provide a suitable theoretical framework for the study of everyday reasoning. Problem space was advanced as "the fundamental organizational unit of all human goal-oriented symbolic activity" (Newell, 1980, p. 696), and defined as a set of states (symbolic structures) and operators that take states as input and yield new states as output. Galotti hypothesized that for problems in everyday reasoning and decision making, the problem space might consist of the various scenarios that a person can generate by considering different options and that operators might be seen as "changes in the assumptions initially made and the resulting construction of new scenarios based on those changes" (Galotti, 1989, p.343). This suggests that a problem space refers to a mental representation of the problem that is in a state of continual motion and modification, a dynamic process.

The idea that problem solving and decision making takes place by generating a mental 'space' within which one searches for a correct or useful solution has been proposed in various ways by other authors as well. Johnson-Laird (1982, 1983) advanced the idea of the existence of 'mental models', which would be both searched and constructed in the process of reasoning about a problem, and Biel and Montgomery (1989) suggested that decision makers construct internal scenarios, representing possible future states, within which they test hypotheses about these future states on the basis of causal chains of beliefs concerning the outcome of different alternatives. The anthropological literature has also proposed the notion that people rely on creating scenarios (dynamic structures in which goals, plans and expectations come together and function inseparably to represent the decision problem) in their decision making activity (Mathews, 1987; Nardi, 1983). Intuitively, the idea that people construct imaginary scenarios to test out several options to pursue in order to solve a problem or to make a decision makes sense. It sounds plausible that individual differences in the scenarios that people construct will account for differences in both the decision-making strategies that they use and the decision outcomes.

Knowledge base

The findings of Elstein and his colleagues (1990) have pointed to the relevance of people's knowledge base for the understanding of differences in decision-making processes and outcomes. One might say that the temporary representation of the decision problem is 'embedded' in the person's more permanent system of knowledge and values. Research in the area of social cognition has indicated that existing knowledge structures influence the way in which people interact with their social and physical environment (Fiske & Taylor, 1984; Kruglanski, 1989). According to Kruglanski (1989) knowledge consists of propositions in which a person has a given degree of confidence. What people 'know' is what they confidently believe in. He presumed that knowledge is stored as a composite of interlinked concepts, which can consist of schemata or (clusters of) beliefs. Values may be conceived as part of the knowledge base. Rokeach (1968) defined values as "enduring beliefs that specific modes of conduct or end-states of existence are personally and socially preferable to alternative modes of conduct or end-states of existence" (p. 159). In addition to beliefs expressing values, people's knowledge also includes beliefs *about* values, particularly beliefs about how values can best be achieved in certain situations (Kruglanski, 1989; Strean, 1993).

Some policy-capturing researchers have attempted to assess parts of knowledge structures by measuring beliefs that they thought might explain differences between decision makers. However, the results of these studies so far are equivocal. In two studies (Holzman et al., 1984; Jacoby et al. 1978) no relationship was found between beliefs about the perceived risk associated with making a wrong decision and the actual decision made. Some other studies (Borko & Cadwell, 1982; Cone, 1978, and Russo, 1978, both cited in Shavelson & Stern, 1981) investigating the role of teachers' traditional versus progressive beliefs in various teaching related decisions, did not reveal a relationship between beliefs and decisions. Only one study (Borko, 1978, cited in Shavelson and Stern, 1981) showed a significant relationship between teachers' traditional versus progressive beliefs and some of their decisions. Shavelson and Stern (1981) also described some studies showing that teachers' conceptions of a subject matter and of different types of students were related to their instructional decisions. Although everyday experience tells us that different beliefs will lead people to make different decisions, and the literature on social cognition affirms the notion that existing knowledge structures affect people's interaction with their environment, it appears that it has not been easy to show this relationship in decision making studies. It is possible that the beliefs chosen by the investigators in the above-mentioned studies were in fact irrelevant to the decision that they were interested in, and that other, nonstudied, beliefs existed that were actually relevant. A study by Pearson (1985) on the congruence between teachers' beliefs and their classroom behavior indicated that with respect to specific behaviors some beliefs are relevant and some are not. This would mean that, if one is interested in trying to explain the inter-individual variance in decision making in terms of interpersonal differences in cognitions, it is of crucial importance to identify the relevant beliefs.

Furthermore, it would seem plausible that the sociographic variables that have been used in attempts to explain inter-individual differences between decision makers (e.g. familiarity with the task, gender, age; Borko & Cadwell, 1982; Holzman et al., 1984), have their influence on the decision processes and outcomes through their relationship with knowledge base. It may be assumed that people who share a sociographic characteristics share part of their knowledge base.

Linking the assumption that peoples knowledge bases are important for the understanding of decision variance to the findings that a considerable amount of decision variance can be explained by task and context characteristics (Ford et al., 1989; Payne, 1982), it would follow that the problem representation or decision frame is determined partly by characteristics of the task and the environment, and partly by the existing cognitive framework that the decision maker draws from when confronted with a decision-making situation.

Summary of decision variation

The literature on the factors responsible for variations in decision processes and outcomes points to the importance of the mental representation of the problem in the mind of the decision maker. This mental representation includes possible alternatives, dimensions, pathways and consequences. It may be seen metaphorically as a 'problem space' (Newell & Simon, 1972) in which the decision strategies and processes are rooted, that is, it provides the mental framework in which information is perceived and integrated and in which models or scenarios are constructed that can serve as a basis for trying out or testing alternative solutions or decisions.

The mental representation of a decision problem is determined by an interaction of external factors (task and context characteristics) and internal factors (a person's knowledge base, including beliefs, attitudes, values and conceptions). Depending on these external and internal factors the content of the mental representation may differ from situation to situation and from person to person.

Coaches' decision making about injured athletes

The literature suggests that the cognitive strategies guiding a person's decision making are determined by task, context and personal knowledge characteristics. Each of these components is discussed below with respect to coaches' decision making about an injured athlete's participation in competition.

Task characteristics

The task of deciding whether an injured athlete should participate in competition can be characterized as a relatively closed 'behavioral decision' task, in which the coach needs to evaluate a situation, judge the severity of the injury and the various risks involved, then make a decision of what to do.

There are a number of rather specific cues that may serve as information points, providing the input to the decision problem and co-determining the content of the problem. One can think of the type of injury in terms of traumatic versus overuse, the body part involved and the signs indicating the degree of damage or healing of the tissue. The latter may consist of observable physical signs like degree of swelling, range of motion, functionality, or signs emitted by the athlete through complaints about pain, testimonies of health or denials of symptoms. A third source of information can be the availability of medical guidelines provided by a physician, physical or athletic therapist, and possibly guidelines about mental readiness provided by a sport psychologist. There may be variations in the source of this information (and reliability of the source), such as direct contact between coach and health care professional, and transfer of information by either the athlete (trusted or not) or his or her parents. Variations may also exist in the specificity of the guidelines and in the direction of the guidelines (no participation, conditional, partial or full participation).

The possible alternatives to choose from range from no participation to full participation with various degrees and forms of participation in between, for instance, leaving the decision to the athlete, making the decision conditional upon how the athlete will feel on the day of the competition, or modifying the conditions of participation (e.g. using a brace or tape, playing in a different position, only competing in specific events, etc.). Judging the various risks involved (e.g. the estimated physical risk of participating, the perceived gains and losses of not participating etc.) includes estimating probabilities and considering the consequences associated with the outcome. As was shown previously, deciding to participate with an injury means risking the formation of chronically problematic scar tissue, a slower and prolonged healing process and the occurrence of permanent damage in the form of joint instability, osteo-arthritis, reduction in range of motion or sensitive tissue that reinjures easily (Arnheim, 1985; Lachman, 1988). Slovic, Fischhoff and Lichtenstein (1984) noted that risk perceptions are often influenced by the availability heuristic. That is, people tend to overestimate the probability of events that are salient in their memory (for instance because they have recently or often experienced this event, or the event has received a lot of media attention) and underestimate events that are not salient. With respect to the perception of risk involved in the participation of injured athletes, it may be expected that a recent experience with an injured athlete whose injury was seriously aggravated by participation will influence a coach's decision in the direction of less risk-taking, whereas a history of dealing with athletes who participated with injuries without serious aggravation may be expected to increase the coach's willingness to take a risk.

Situational characteristics

One of the situational element impacting on a decision regarding the participation of injured athletes is the phase of the season. Rose's (1991) study indicated that injured athletes are more likely to show denial and bargaining behavior when an injury occurs shortly before or during an important competition. A coach in Flint's (1988) study commented that his decision about returning an injured player to a game would be co-determined by the proximity and importance of the next game. A distinctive situational variable therefore, seems to be the next competition. Choices for no participation, conditional or definite participation will likely depend on the importance and immediacy of this competition.

It is plausible that the decision to participate in an upcoming competition is affected by external pressure to win or perform well, which may result from different sources, for instance, parents, administration, the goals of the athlete, media etc. The amount of this pressure can be expected to be higher at higher competitive levels, and in professional sports.

Other situational factors that are likely to play a role in the decision making of the coach are the accessibility of medical advice and characteristics of the injured athlete. It is conceivable that the coach will rely more on the advice of a health professional when this can be easily accessed, especially when there is time pressure. Characteristics of athletes themselves, such as age, personality, physique, possibly gender and the amount of time the coach has worked with an athlete, may affect the degree to which the coach takes the athlete's wishes to participate or not into account, or the degree to which the decision will be left to the athlete. It is plausible that the status of the athlete within the team will also play a role in the decision. Flint (1988) found an interaction effect between a player's status in a basketball team and the situation of the game. In a close game situation coaches were more likely to return an injured starter or injured first substitute to the game than an injured bench player, whereas in games where the outcome (winning or losing) was already determined bench players were more likely to be returned than starters or first substitutes.

Individual characteristics

It is assumed that peoples' decision processes are determined in part by their existing knowledge structures. Belief structures that organize coaches' behavior have popularly been referred to a their 'coaching philosophy', but Strean (1993) proposed the use of the term 'ideology' to refer to these structures, because the term 'philosophy' officially alludes to "a search for truth through logical reasoning" rather than to a set of values and beliefs constructed on the basis of experience and interpretation. Knowledge that can be expected to affect the decision-making process involve beliefs regarding the relationship between reported and observed physical symptoms and the degree of damage and healing, as well as beliefs about the risks to the health of the athlete when he or she participates injured, and about the risks involved in participating with this particular injury. Other cognitions that may be relevant include knowledge about ways to check if an athlete is ready to return to full participation, knowledge about an athlete's limitations and abilities, beliefs about one's own responsibility and the responsibility of the athlete in making the decision, experiential knowledge of how a particular athlete reacts to an injury, and attitudes about the relative importance of health and winning. Hoehn (1989) suggested in this respect that coaches who are tough and aggressive themselves and pressure their athletes to be tough and fight off pain, may contribute to injury because athletes are afraid to report pain to them.

Background variables such as the gender of the coach, his or her qualification level in the NCCP program and in injury care, coaching experience and experience with personal injuries and injured athletes may affect the knowledge base that a coach needs to draw upon when making a decision. The age and competitive level of the athletes that coaches are involved with may also be related to their ideology. Chaumeton and Duda (1988) for instance, showed that developing a winning team is a more important goal for coaches at high school varsity level than at junior high and elementary school level.

Summary and conclusions

The topic of this study, coaches' decision making regarding the participation of injured athletes in competition, has directed this literature review to two different areas: (a) injuries, injured athletes and the responsibilities of coaches to injured athletes, and (b) general decision-making theories and research.

The literature on injuries indicates that the physiological processes involved in the healing of different injuries follow a more or less uniform pattern: an inflammatory reaction followed by a process of rebuilding the damaged tissue, usually in the form of scar tissue. Proper treatment is crucial for the quality of the scar tissue that is constructed. This proper treatment generally includes rest (except for stretching and range of motion exercises after the inflammatory stage of the injury) and delay of activity until full functional capacity has been restored.

The athlete's psychological and behavioral reaction to an injury forms part of the input information defining the decision situation for the coach. Research so far indicates that injured athletes are likely to show various degrees of denial in acknowledging their injury, experience a range of negative emotions, and sometimes disregard medical advice. These reactions may be especially strong when the athletes are highly motivated to train or compete, feel invulnerable and lack knowledge about injury symptoms and consequences. The tendency to bargain with or deny an injury may lead to underreporting of the seriousness of the injury to the coach, thereby complicating his or her decision making about the level of activity that should be permitted to the athlete. This decision may be further complicated by conflicting goals, such as a pressure to win, the (legal) responsibility to provide reasonable care and safety to athletes, and the (ethical) expectation to respect the right of athletes to self-determination. It is the purpose of this study to attain an understanding of how coaches deal with the often conflicting factors determining the decision situation regarding the participation of injured athletes in competition.

In the literature on individual decision making four approaches can be roughly distinguished: (a) decision theory approach, (b) policy-capturing approach, (c) information-processing approach, and (d) decisional style approach. The policy-capturing approach and the information-processing approach are concerned with the cognitive aspects of decision making, and are therefore of most interest to this study. In the policy capturing approach, regression and ANOVA models are used to try to capture decision makers' strategies of weighting and integrating information in the course of making a decision. In the process-tracing approach, verbal protocols, resulting from subjects thinking aloud while solving a problem, are analyzed with respect to the information search and integration strategies used.

Decisions come in a variety of forms and structures, and have been distinguished according to several different characteristics, such as complexity, closed- versus openness, degree of uncertainty (probability estimates), and structure. Within the policy-capturing and process-tracing approaches two types of task structures can be found. In one the decision maker is asked to evaluate a number of case descriptions and judge each case on some dimension, in the other, the decision maker is asked to make a choice on the basis of an (implicit) evaluation of each case description. This choice may include a selection of one of the cases, or specific actions to be carried out for each case. The decision task in this study, regarding the participation of injured athletes in competition, has the structure of the latter task: a 'behavioral' decision in which a specific action needs to be chosen on the basis of an evaluation of a 'case description'.

Differences in decision outcome may be the result of an interplay of a variety of factors, both external and internal to the decision maker. It is generally assumed that variances in decision outcomes are the result of differences in the cognitive strategies used in arriving at the decision outcomes. These cognitive strategies are rooted in the representation of the problem in the mind of the decision maker, which, in turn, is based on both external and internal factors. External factors involve situational and task characteristics, internal factors include the knowledge structures (beliefs and values) that people draw upon when making a decision in a certain area. Commonalities and differences in these knowledge structures may be related to commonalities and differences in sociographic factors such as age, gender, experience and education of the decision makers.

CHAPTER III

METHOD AND PROCEDURES

Introduction

The purpose of this study was to provide insight into the strategies and considerations employed by coaches in their decision making regarding the participation of injured athletes in competition, and to gain an understanding of the factors that influence these strategies and considerations. This chapter outlines the design and methods used in this study.

Method

Using a survey format, telephone interviews were conducted with 64 coaches of competitive female gymnasts in the province of Alberta. During these interviews both quantitative and qualitative information was collected with respect to coaches' decisions about hypothetical scenarios in which an athlete suffers an injury prior to a competition. In addition, data were collected about a number of background variables.

Data collection

The Alberta Gymnastics Federation (AGF) provided the researcher with a list of all the competitive gymnastics clubs in Alberta. By telephoning one of the contact persons for each club the names, addresses and telephone numbers of 70 coaches of competitive female gymnasts were obtained. Only one club contact person did not want to give out the names and phone numbers of the club's competitive coaches, but suggested he would inform the coaches about the study and ask them to contact the researcher if they wanted to participate. One coach, out of a possible 3 or 4, responded to this request. Except for the coaches of this particular club, the list of 70 coaches represented the total number of coaches active in coaching competitive female gymnasts in the province of Alberta at the time of the study.

The data collection took place in two phases. Coaches north of Red Deer were approached first, coaches south of Red Deer were contacted later in the year after funding had been allowed for an expansion of the study. All coaches received a letter (Appendix A) - the first group in March, the second in September 1992 -, explaining the purpose of the study, the background of the researcher and the ethical guidelines that would be followed. The letter further announced that the coach would be contacted by phone within the next couple of weeks. The coaches were phoned from 1 to 3 weeks following the letter. They were asked if they had received the letter and if they would mind participating in the study. If the coach agreed to participate a time was set for the interview; in some cases it was possible to do the interview right away. Of the 70 coaches that were initially listed, one had to be dropped because he turned out to be coaching male gymnasts only and did not have any experience coaching female athletes, and one because she could not be reached by telephone. Three more coaches had to be dropped later, because, although they initially agreed to be interviewed, it was impossible to reach them for the actual interview. One coach refused to participate because of language problems, whereas another coach, for the same reason, invited the researcher over to attempt the interview at her home rather than over the phone. Because of the language problems and lack of time, it was not possible to go through the complete questionnaire in this particular case, but the interview provided interesting qualitative information nonetheless. Eventually, 64 coaches from 29 different clubs were interviewed over the phone, 31 (48.4%) in the first phase, 33 (51.6%) in the second phase. This represents approximately 90% of the total number of coaches in competitive female gymnastics in Alberta at the time of the interview.

Six interviews were conducted prior to the data collection for the study, to test the clarity and wording of the questionnaire and to practice its administration over the telephone. The individuals taking part in this pilot phase were two coaches of male gymnasts, two former coaches of female gymnasts, one coach who was presently coaching female gymnasts and one coach from another individual sport. The pilot work led to minor changes in the questionnaire, and to the decision to audiotape the interviews. This decision was made because it was found that the coaches provided a lot of comments regarding why they made the decision the way they did and the factors that they would take into consideration. To capture the richness of this information it seemed appropriate and valuable to record these comments on tape.

During the formal data collection, the coaches were asked permission to tape the interview at the beginning of the conversation, with the guarantee that the tape would be erased after completion of the study. All coaches consented readily to have the interview recorded. An automatic telephone answering machine (General Electric Beeperless Remote-Automatic Telephone Answering System, model 2-9860) with a recording device was used for the taping, which made it a very simple procedure.

The interviews lasted between 20 and 80 minutes, with an average of 46.5 minutes. All interviews were conducted by the researcher.

Questionnaire

The questionnaire included both open and closed questions (Appendix B), and was designed to collect information on the following factors: (1) the coach's likely decision in each of 16 hypothetical scenarios, describing situations in which an athlete suffers an injury prior to a competition, (2) situational factors, in particular the coach's current coaching situation and relevant rules and procedures within the club, (3) the coach's background in terms of coaching experience, athletic experience, general education, coach education and education specific to injury care and management, and (4) the coach's injury history, i.e. experiences with own or athletes' injuries.

The 16 scenarios were designed according to a full factorial design (Louviere, 1988), representing the 16 unique combinations of 4 parameters with 2 levels each. These 4 parameters were: (a) the importance of the competition (an invitational tournament versus an important qualifying meet), (b) the age of the athlete (8 versus 15 years), (c) the ability level of the athlete (average versus best), and (d) the severity of the injury (a moderate second degree ankle sprain that happened 1 week ago versus a severe second degree ankle sprain that happened 3 weeks ago). The 16 combinations of parameter levels were randomly divided over the scenarios, so that there was no logical order in the presentation of the parameter levels. The scenarios were presented in the same order to each coach, however. The description of each parameter level stayed the same across all scenarios, except for the description of the injury. Before the scenarios were presented, the coaches were advised to make some notes on the content of the scenarios. After the first two scenarios which contained descriptions of each injury (see Box 3.1), the coaches were told that the first injury would be referred to as 'moderate' injury and the second as 'severe' injury, and were asked if they wanted to hear the description of the injury again. Only two coaches asked for this. The athlete's desire to compete was kept constant throughout the scenarios, that is, in all situations the athlete wanted to compete.

The choice of the injury was based on the consideration that an ankle sprain is a common injury in gymnastics (Caine, Cochrane, Caine & Zemper, 1989; Mandelbaum, 1991; McAuley et al., 1987; Meeusen & Borms, 1992) and it could therefore be expected that coaches were relatively familiar with this type of injury. With respect to the severity of the injury, situations were sought in which it would not be obvious that the athlete would be completely unable to compete. Since there would be little choice in such situations, they would probably result in low variances, both among scenarios and among coaches. Therefore an attempt was made to describe a fairly ambiguous situation, in which there might be room for a lay person to consider competing on the ankle, but in which a medically trained person would not recommend competing. To assure the latter, two sport physiotherapists were consulted on the description of the injuries. The severe injury differed from the moderate injury in the degree of damage initially done. To avoid turning this into a situation in which the decision would be

Moderate 8 Year Old Athlete of Average Ability Important Qualifying Competition
Imagine that you have an 8 year old athlete who sprained her ankle exactly one week ago. She has recovered to the point where there is still some swelling and some minor limitation in the range of motion. She is guarding her foot a little bit and is limping after she performs one or two elements in which she needs her feet. This weekend, there is an important qualifying meet coming up, you can think of Zone Championships or Interprovincial Cup Trials. The athlete says that she is "fine" and she is eager to participate in the competition. This is an athlete of average ability, and although she is enthusiastic and loves gymnastics you would not expect her to place in the top 8 or 10, even with her best performance. It is now the night before the competition, and you have to decide whether or not you will allow her to compete.

Severe 8 Year Old One of Your Best Athletes Important Qualifying Competition
In this scenario there is again an important qualifying competition coming up this weekend. Now imagine that you have an 8 year old who is one of your best gymnasts. She would almost certainly place in the top 8 of her category if she could compete well. However, 3 weeks ago she severely sprained her ankle. She was on crutches for about a week. She has kept her fitness level up by swimming and riding a bike and stretching, but she has done practically no weight bearing activities. This week she has started to do some training, mostly on beam and uneven bars. She has recovered to the point where there is still some swelling and a limited range of motion. She is limping when she walks into the gym. Yet, she is eager to compete again and says that the pain does not bother her. It is now the night before the competition, and you have to decide whether or not you will allow her to compete.

Box 3.1. Text of first two scenarios.

evident, the period of time since the occurrence of the injury was increased, so that the athlete would be at a comparatively similar stage of healing. However, some of the symptoms were still more severe, and the athlete had missed several weeks of training. The two age groups were chosen on the basis of the consideration that, on the one hand 8 year old athletes represent a group of young children that are obviously still growing, while 15 year old athletes, in comparison, tend to be more mature, both physically and psychologically, but might still be regarded as young enough to have someone else make a decision for them. Eight years is also the youngest age group for which organized competitions exist in Alberta. The choice for the meet operationalizations was based on the assumption that competing at an important qualifying meet would be considered more important than competing at an invitational tournament. A similar assumption underlaid the operationalization of ability level into best and average athletes, which was also based on Flint's (1988) finding that the status of an injured athlete on the team affected the likelihood of competing.

The coaches were asked to indicate, on a scale of 0 to 10, how likely it was that they would let the athlete participate in a competition, 0 referring to highly unlikely, 10 to highly likely. After the coaches indicated their scores, their choice was verified by asking: "So, it is ...... that you would let the athlete compete?", filling in the blank according to the following scale: 0-1: highly unlikely, 2-3: quite unlikely, 4: unlikely, 5: tentative, in the middle, 6: likely, 7-8: quite likely, 9-10: highly likely.

Data analysis

The interview tapes were transcribed, resulting in 64 files with text. In addition, the coded answers to the closed or semi-closed questions of the questionnaire, as well as the ratings provided in response to the 16 scenarios were recorded in a data matrix and entered into the computer. The files with text were consequently analysed by means of a qualitative data analysis, whereas the data matrix was used as a basis for a quantitative analysis.

Qualitative analysis

The qualitative analysis of the text files followed the basic process of analyzing qualitative data, in which categories are sought that describe the various components of a phenomenon expressed in the text (Tesch, 1990; Miles and Huberman, 1984). The units of analysis are 'segments of text' which are classified by 'labelling' or 'coding' according to the categories. Labelling text segments and seeking and defining categories is a blended process of comparing text segments against tentatively developed categories, refining categories and creating new ones to fit new information in the text. It is a process of continually verifying that the categories fit the text segments that they are representing.

The analysis of the text files was separated into an analysis of the answers provided to the open-ended questions, and an analysis of the statements made in response to the scenarios. The manipulation of the text files was done within the Word Perfect word-processing system on an IBM computer, principally using copying and appending commands; no specific program for the manipulation of qualitative data was used.

For each of the open-ended questions, the answers of all coaches were copied into one file. By reading through the answers per question, lists of categories representing the different types of answers provided to each question were developed. These lists were used either to describe the various types of answers given, or to categorize the coaches according to the type of answer that they gave, or both.

The analysis of the statements made in response to the scenarios consisted of the following steps. (1) The verbal responses to each of the scenarios were copied into separate files for each scenario; in addition, any comment pertaining to the scenarios made at other points during the interview were copied into a distinct 'comments' file; this resulted in 16+1=17 files. (2) By reading through the responses provided to the scenarios as well as the comments, a list of 20 categories was developed, representing the different types of considerations mentioned by the coaches in their answers. (3) Reading through the same responses again, text segments were labelled with codes for the categories identified in step 2. (4) All text segments with the same code were copied into a distinct file. (5) All the text segments pertaining to one category were studied as a whole in order to identify the various components and manifestations of this category of considerations, e.g. different subtypes of considerations and different conditions. This analysis resulted in a descriptive account of factors taken into consideration by coaches in their decision making about injured athletes' participation in competition. Chapter IV, part II contains the description of this part of the qualitative analysis.

In a next step, the qualitative information was transformed into quantitative data, which could then be used to examine the relationship of the considerations with other variables. On the basis of the 20 categories of considerations identified in the qualitative analysis, and the description of the various subtypes of these categories, a list of 95 numbered codes was developed, corresponding to the 20 different categories and their sub-categories (Appendix D). Per coach, the comments made in response to each of the scenarios were reread and classified according to the list of 95 codes. The units of analyses were statements, defined as meaningful segments that contained either (a) an argument that would raise or lower the likelihood of competing, (b) an evaluation of the risks involved, or (c) a course of action that would be undertaken. A form of intra-coder reliability was applied to the coding of these data, in which the researcher coded the data twice, with a four-week interval in between. Discrepancies between the two coding occasions were discussed with the project supervisor until a satisfactory code was selected. The coding resulted in 16 matrices, one for each scenario, of 64 coaches by 95 types of statements, containing the frequencies with which each of the statements was mentioned by each of the coaches.

Quantitative Analysis

Following the approach to policy-capturing outlined in chapter II, in which decision makers' policies are captured in a mathematical model, the scenario data were analyzed using the method described by Louviere (1988), known as 'metric conjoint analysis'. This approach to conjoint analysis utilizes a multilinear polynomial mathematical model to estimate the relative importance of informational parameters (also referred to as attributes, cues or factors) as weighed in a decision maker's choices. These choices are measured as responses on Likert type scales to different combinations of the parameter levels. Conjoint analysis as described by Louviere employs either multiple regression analysis with effect coding or analysis of variance (ANOVA) or a combination of both. In this study, a combination was used. ANOVA's were conducted at the aggregate level for the whole group of coaches, as well as separately for coaches at different competitive levels. Multiple regression analyses were carried out at the individual level, calculating regression weights for each coach, representing her or his 'decision policy' in relation to the four parameters that were systematically varied in the scenarios. These regression weights were subsequently used in a K-means Cluster analysis to see if coaches could be grouped on the basis of their policies. Two groups emerged from this analysis. Chi-square analysis was used to assess the connection between cluster membership and the variables representing coach characteristics.

In order to examine the relationships among some of the coach characteristics, as well as among the quantified considerations and coach characteristics, one of the multi-variate analysis procedures from the SPSS-X program 'Categories' (SPSS Categories, 1990) was employed. This program provides the opportunity to look for homogeneous groups and/or dimensions among a number of variables of nominal or mixed measurement levels at the same time. The procedures are called 'optimal scaling' programs, because they are aimed at representing the relationships among the variables in a few dimensions, which makes it possible to detect structure or patterns within the data that would be too difficult to see when the data are left in their original complexity. In this study the HOMALS program (Homogeneity Analysis by Means of Alternating Least Squares; van de Geer, 1985) was used. Rather than calculating a great number of contingency tables, this program can represent the relationships among multiple categorical variables at the same time.

Delimitations and limitations

Delimitations of this study existed in the selection of one type of sport (gymnastics), one gender of athletes (female) and a locally defined sample (coaches in the province of Alberta). As well, delimitations involved the choice of the injury (ankle) and the choice to try and capture the coaches' 'decision policy' on the basis of 4 informational parameters only. Another delimitation concerned the fact that the decision policies were assessed only once and at one point in time, which did not allow for detection of inconsistencies in the use of the policies.

A limitation to the study concerned the fact that the data had to be collected in two phases, which created a possible bias, because the two data sets were collected at different times during the competitive season.

Summary

The purpose of this study was to provide insight into the strategies and considerations employed by coaches in their decision making regarding the participation of injured athletes in competition, and to gain an understanding of the factors that influence these strategies and considerations. This chapter outlines the design and methods used in this study. For this purpose, 64 coaches of competitive female gymnasts, representing 29 clubs in the province of Alberta were interviewed over the phone in the period April-May 1992 and October-November 1992. During these interviews both quantitative and qualitative information was collected with respect to background variables as well as coaches' decisions about hypothetical scenarios in which an athlete suffers an injury prior to a competition. The coaches were presented with 16 hypothetical scenarios, sustaining a full factorial design, including four informational parameters with two levels each, i.e. the importance of the competition (an invitational tournament versus an important qualifying meet), the age of the athlete (8 versus 15 years), the ability level of the athlete (average versus best), and the severity of the injury (moderate versus severe). Metric conjoint analysis, Chi squares and optimal scaling procedures as well as qualitative data analysis methods were used in the analysis of the data.

CHAPTER IV

RESULTS

The results of the study are presented in this chapter in five different sections. Part I describes the background of the coaches in terms of demographic characteristics, educational experiences and injury history, as well as their club's situation regarding injury care and contact with the medical community. Part II contains a description of the qualitative analysis of the coaches' responses to the scenarios. Part III deals with the quantitative analysis of the coaches' responses to the scenarios, i.e. the decision policies. In part IV individual differences between the coaches are examined by relating specific coach characteristics to the decision policies. In part V an attempt is made to quantify the verbal statements made in response to the scenarios and to relate them to the decision policies.

PART I: Background of the coaches

Demographics

Clubs

Twenty nine different gymnastics clubs were involved in the study. The number of coaches interviewed per club ranged from 1 to 6, with an average of 2.2 coaches per club. The mode was 2 coaches per club (13 clubs). In the first phase of the data collection 14 clubs were involved, in the second 15. Nine of the clubs were located in smaller communities (< 10,000 inhabitants), 8 in medium-sized communities (10-50,000 inhabitants) and 12 in larger communities (> 50,000 inhabitants).

Five of the clubs trained gymnasts up to national and international levels (called "National Stream" and "High Performance" respectively)[1]. Eight clubs trained gymnasts up to Class III and IV.

---

[1] The classification system for female competitive gymnasts in Alberta is as follows:

Class I: non-sanctioned inter-zone competitions; base level of 'fun meets'; goal is to move to class II

Class II: more challenging, achievement oriented; Zone Championships, AGF sanctioned; Alberta Winter Games

Class III: competes modified FIG optional routines; goal is to take part in team & zone championships, and to move to class IV; Interprovincial Cup

Class IV: competes contemporary FIG optional routines; primary goal is to place on the provincial team for Western Canadian Championships

National Stream: primary goal is to make the Canadian team; Provincial Championships; (Trials for) National Championships

High Performance: primary goal international competitions

Another 9 clubs trained mostly Class II gymnasts, with possibly a few lower and a few higher level gymnasts, whereas 7 clubs trained primarily Class I gymnasts.

Coaches

The majority of the coaches were female (49; 76.6%); 15 coaches were male (23.4%). The age of the coaches ranged from 16 to 57 years, with a mean of 28.6 years (s.d. 8.1), while coaching experience ranged from 1 to 35 years, with an average of 9.5 years (s.d. 7.1). Five coaches (7.8%) were not actively coaching at the time of the interview, but had been doing so until recently. The rest of the coaches trained an average of 13 athletes at the time of the interview (s.d. 8.9). All six competitive levels distinguished within women's gymnastics were represented among the athletes trained by the coaches in this study. At the time of the interview, 26 coaches (40.7%) were working with gymnasts who competed in class II or lower; 20 coaches (31.3%) were involved with class III and/or IV athletes, while 13 coaches (20.3%) trained gymnasts up to national and/or international levels. However, 20 coaches (31.3%) had in the past worked with athletes of a higher competitive level than they were coaching at the time of the interview. In total, 23 coaches (36%) had worked with National Stream/High Performance gymnasts; 24 (37.5%) had coached gymnasts up to class III or IV, and 17 (26.6%) had worked only with gymnasts up to class II. The majority of the coaches (59; 92.2%) had themselves been competitive gymnasts in the past. More than half of them had competed in class III or IV (31; 54.2%); 10 (16.9%) had competed at national or international level, and 17 (28.8%) had competed in class II

Table 4.1.1 : Highest levels of competitive involvement, present and past.

	Highest level currently coached		Highest level coached ever		Highest level competed	
High performance	8	12.5%	11	17.2%	5	7.8%
National Stream	5	7.8%	12	18.8%	5	7.8%
Class IV	8	12.5%	11	17.2%	19	29.7%
Class III	12	18.8%	13	20.3%	13	20.3%
Class II	16	25.0%	12	18.8%	7	10.9%
Class I	10	15.7%	5	7.8%	10	15.7%
not	5	7.8%			5	7.8%

or lower. Table 4.1.1. gives an overview of the highest levels coached at the time of the interview and in the past, and of the coaches' own competitive level.

Education

Coaching specific education

Sixty one (95.3%) coaches were certified through the Canadian National Coaching Certification Program. One coach had a non-Canadian coach certification and 2 coaches were not certified. Six coaches (9.4%) were certified at level I, 3 of whom had completed parts of the level II requirements. A total of 38 (59.4%) coaches were certified at level II, 17 of whom had completed parts of the level III requirements. Another 15 (23.5%) coaches had completed level III, of whom 1 was partially certified at level IV. Three (4.7%) coaches had completed level IV.

General education

More than 40% of the coaches (28; 43.8%) had completed a university degree (of which 17 were in Physical Education and one in Physiotherapy). One coach had a Masters degree in Physical Education. Of the remaining coaches, 11 (17.2%) had received a high school diploma, 10 (15.6%) had completed a college degree or diploma program, and 14 (21.9%) attended university but had not finished their degree at the time of the study.

Education in injury care and management

The coaches presented a wide range of educational experiences regarding injury care and management, varying from first aid courses and injury clinics to specific personal experiences. Forty eight coaches (75%) had taken either a standard or an athletic first aid course, or both. Eleven coaches (17.2%) had taken a course in Cardiopulmonary Resuscitation (CPR). Twenty six coaches (40.6%) reported having taken part in one or more workshops, symposia, courses or clinics organized specifically for the benefit of coaches, to educate them on relevant aspects of injury care. Four of these coaches had participated in only one of these organized sessions, 12 in a couple of them, 5 had taken part in quite a few and 5 had participated in a large number of these types of sessions. The indication of the number of experiences is rather vague, because the coaches could often not remember exactly how many clinics or workshops they had taken and tended to use inexact terminology to indicate the amount and type of education they had had, for example, "*lots of workshops and stuff*".

Of the coaches who had completed a degree in Physical Education, 4 (6.3%) had specialized in Athletic Therapy. The others may be expected to have taken at least one mandatory course in

Athletic Therapy as part of their degree. Two coaches without a degree in Physical Education had also taken a course in Athletic Therapy.

Several coaches (19; 29.7%) mentioned specific personal experiences that had given them insight into the background and management of athletic injuries. These experiences included personally having had many injuries, talking with medical professionals whenever the opportunity arose, reading about injuries as much as possible, learning about anatomy and physiology through one's job training (e.g. fitness instructor, dental assistant, physiotherapist, athletic therapy assistant), and being around people who know a lot about injuries and how to deal with them.

Injury background

More than 80 per cent of the coaches (52; 81.2%) reported having had an ankle injury themselves, and often (28; 43.7%) more than one. Twenty three of these coaches qualified their ankle injury as having been severe, 12 as mild or moderate, and 16 coaches indicated that they had had both moderate and severe ankle injuries. Twenty five coaches experienced their first (sometimes only) ankle injury at or before the age of 15, 22 had their (first) ankle injury after the age of 15.

Twenty six coaches (42.3%) said they had once missed an important competition because of an injury. For 17 of them this had been a negative experience, the others remembered it as a more or less neutral experience. Forty coaches (62.5%) had had the experience of competing with an injury, 14 of which said it was a good experience, 16 said it was neither a good nor a bad experience, and 10 said it was a bad experience.

More than half of the coaches (45; 70.3%) indicated that they had had an injury in the past that was still somehow affecting them today, either to a minor (16), moderate (22) or major (7) extent. These injuries varied from broken or sprained ankles and wrists to torn knee ligaments, overuse injuries of shoulders, and 'bad backs'. There were four different ways in which the injuries were still experienced as bothersome. Some coaches (14) said that the injury limited them in their athletic activities, but not in their daily life. Others (12) indicated that the affected body part was bothersome or painful once in a while, but it did not limit them in any of their activities. Another group of coaches (10) reported that it was something they had to be aware of most of the time, because the injury could reoccur easily, or the affected body part might 'give out'. The rest of the coaches (7) said that the injury was definitely affecting their daily life, that is, it was painful and/or limiting their activities most of the time.

Asked whether the fact that this injury was still affecting them today could have been prevented if in the past they or someone else would have taken better care of the injury, 21 coaches responded affirmatively. Twelve coaches thought that the injury had been taken care of properly and that it was just bad luck that it was still bothering them. Six coaches said that they had no idea whether it could have been prevented.

Half of the coaches (32) reported knowing or knowing of an athlete who experienced negative consequences (71.9% physical, 28.1% emotional) as a result of competing with an injury. This athlete was personally known to 17 of the coaches; for 7 coaches it was somebody specific they had heard of or seen, but did not personally know, and 8 coaches talked about athletes in general whom they had observed suffering negative consequences as a result of competing with an injury.

Injury management

Access to medical advice

Access to medical advice was generally specific to the club's situation. Three of the clubs had managed to develop a system in which the athletes had easy access to a medically trained professional with expertise in athletic injuries. One of these clubs had befriended a sports medicine specialist while he was going through his sports medicine training, and was still making use of this specialist's services. The athletes could go to him directly, without a referral from their family doctor. Another club had, what one coach called "a medical triangle" set up, consisting of a specialist and a physiotherapist at the university sports medicine clinic, and a chiropractor who was an ex-gymnast, all of whom could be contacted directly, without a referral, and who provided useful feedback and recommendations about the athletes' injuries. The third club worked with a chiropractor, who was referred to as "our sports therapist". Generally, the athletes would be sent to this chiropractor first, who would either treat the athlete or recommend referral to a physiotherapist (via the family doctor). He would also periodically come into the gym, to see how the athletes were training - especially if he perceived a 'trend' in the types of injuries that the gymnasts were presenting with. He had travelled to meets with the club on a couple of occasions as well. The coaches of all three clubs indicated to be quite happy with the arrangements that they had made, because it enabled their athletes to receive immediate attention to any injuries or soreness that they might develop, and it guaranteed the coaches access to sensible advice regarding the athlete's training. How these support systems had initially been established was not elaborated upon in the interviews.

Five of the clubs (17.2%) indicated having some type of paramedic association, ranging from knowing a physiotherapist with whom the coach could discuss cases, to having a massage therapist work with the gymnasts on warm-up and flexibility, to enlisting the help of parents who happened to be medical doctors or physiotherapists if the need would arise.

For 13 clubs (44.8%), there was no formal or informal association with a medically or paramedically trained professional, to whom they could send their athletes without a referral. However, the coaches of these clubs tended to indicate that they would advise their athletes to go to a specific physiotherapist, specialist or sports medicine clinic that they were familiar with. Often they would recommend someone whom they knew personally and had had good experiences with.

In seven clubs (24.1%), there was no association with a (para)medically trained professional, nor were any doctors recommended by the coaches. In these clubs, the athletes and their parents generally found their own physician and medical advice, without any recommendations or mediation by the club.

Decisional responsibility

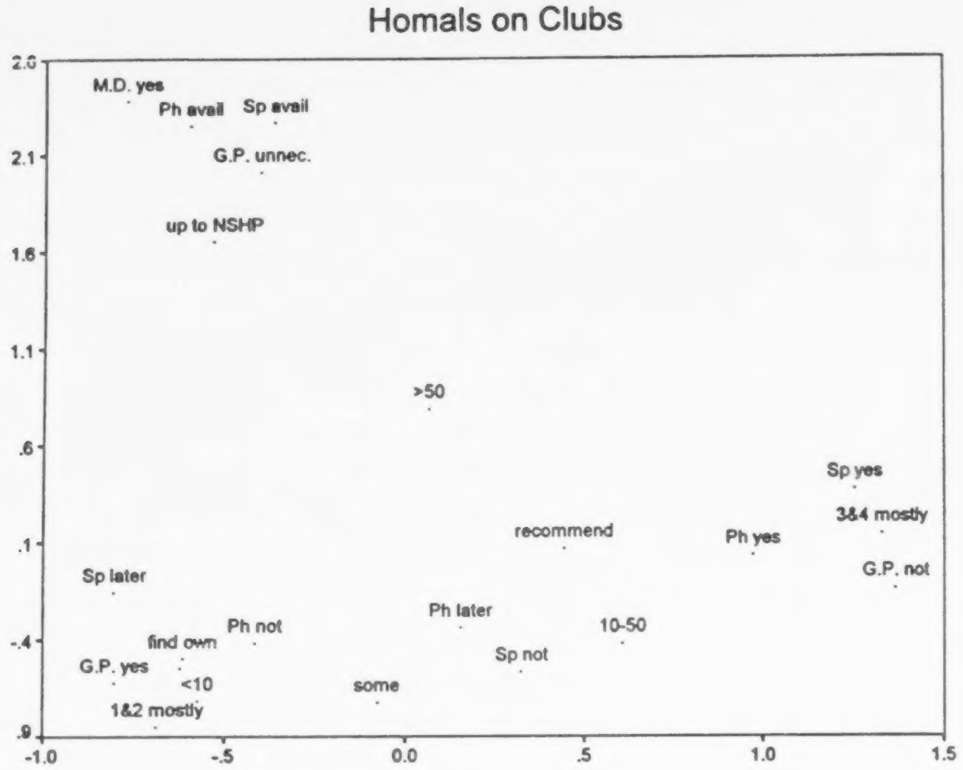
The majority of the coaches (52; 82.2%) indicated that they were the ones, sometimes in consultation with their head coach, who would make the decision about an injured athlete's participation in competition. Five coaches said that the athlete and/or her parents would make the decision, while 4 coaches reported that it would be a joint decision of coach, athlete and parents. One coach indicated making the decision himself after consultation with the doctor and physiotherapist, but noted also that the parents could always veto this decision. Two coaches said that the final decision was up to the doctor.

Trust in family doctors

In order to examine the coaches' confidence in the advice of their athletes' family physicians, they were asked whether they thought that the family doctors of their athletes knew enough about athletic injuries in gymnastics to give appropriate recommendations. The majority of the coaches (56; 87.5%) responded negatively, and some of them were quite strong in the verbalization of this negativeness ("*No way!*", "*Absolutely not*", "*Not a chance*", "*Pathetic in some cases*"). A small percentage of the coaches said yes (5; 7.8%) and 3 coaches (4.7%) said they did not know. When asked why they thought the recommendations of family doctors were inappropriate, a variety of reasons were expressed. The most common reason cited was lack of understanding of the involvement level of the athlete in the sport, and the need for the athlete to get back into training as soon as possible. It was generally felt that family doctors tended to recommend complete rest ("*take 2 weeks off*"), rather than active rest, in which the athlete could still come into the gym and work on conditioning, flexibility and skills that did not involve the injured part of the body. Another common reason cited was lack of knowledge of existing treatments, especially physiotherapy and chiropractic treatments, and lack of knowledge regarding rehabilitation exercises. Some other reasons included: misdiagnosis, giving vague or no recommendations, not explaining what causes the pain, not understanding the nature of gymnastics.

Because a person's entrance into the health care system generally starts with or depends on a visit to a general practitioner, it may be expected that many coaches will be confronted, more or less frequently, with recommendations provided by a family doctor. The coaches who indicated that they did not put a great deal of trust in the recommendations of a general practitioner were therefore asked how they handled situations in which athletes would come to them with recommendations of a family doctor. The responses included four different types of reactions. Some coaches said they managed to avoid this situation because their club had arranged direct access to a person trained in sports medicine (see previous section). A number of coaches said that they would still follow the recommendations (*" I listen to what they say, you bet I do. I may not agree with it in the back of my mind, but... he is a doctor, I am just a coach" "I follow them of course; I am not a doctor, so of course, I do what the doctor says"*). Other coaches said they would follow the recommendations if they made sense to them; if not, they would recommend that the athlete go back and ask for a referral to a specialist or physiotherapist (*"if I am not satisfied with what the doctor said, I ask the parents to get a referral for a sports medicine clinic" "if it sounded ridiculous I would recommend to see a sports doctor"*). Fourthly, a number of coaches said that they advised their athletes and their parents to ask for a referral to a sports medicine specialist or physiotherapist right away, the first time they would go in to see their family doctor with an injury (*"we send the kids to their doctor and say 'don't even ask for a check-up, just ask for a referral'"*).

In order to explore the relationship between the club's situation in terms of access to medical care and its location and competitive level, a HOMALS analysis was carried out. This analysis looks for a solution that minimizes the distance between objects (in this case clubs) scoring in the same categories and maximizes the distance between objects who score in different categories. The results are presented in a plot containing the various category labels. The plot resulting from the HOMALS analysis on club variables is provided in Figure 4.1.1. As the plot shows, this analysis indicated that clubs who had direct access to medical advice, and therefore did not need to consult a family practitioner, tended to be the clubs with the more elite level athletes (National Stream and High Performance), located in one of Alberta's larger communities (top half of the plot). On the other hand, clubs where the athletes had to find their own doctor were more likely to be the clubs with the lower level athletes (class I and II), located in smaller communities; the coaches of these clubs tended to listen to the recommendations of a family physician, but might advise the athlete to go and see a specialist if they did not agree with the recommendations. The right side of the plot shows that coaches of clubs of intermediate level athletes (class III and IV) were more likely to instruct their athletes to ask for a referral to a physiotherapist or a specialist right away; they might know a particular doctor that they would recommend. Clubs of these levels tended to be located more in the medium-sized towns.



legend

M.D. yes: physician associated with club
Ph avail: physiotherapist associated with club
Sp avail: specialist associated with club
G.P. unnec: listening to family doctor not necessary
up to NSHP: up to national/international level
> 50: community of > 50.000 inhabitants
Sp later: ask for referral to specialist if not agreeing with g.p's recommendations
G.P. yes: follow advice of family doctor
find own: athletes have to find own physician
1&2 mostly: mostly class I & II
< 10: community of less than 10.000 inhabitants
Ph not: no referral to physio mentioned
some: some miscellaneous paramedical care available
Ph later: ask for referral to physio if not agreeing with g.p's recommendations
Sp not: no referral to specialist mentioned
recommend: coaches recommend specific physician
10-50: community of 10-50.000 inhabitants
Ph yes: ask for referral to physio right away
Sp yes: ask for referral to specialist right away
3&4 mostly: mostly class III & IV
G.P. not: advice of family doctor not mentioned

Figure 4.1.1 Plot of HOMALS analysis on club variables.

Summary of Part I

Sixty four coaches of 29 different gymnastics clubs, comprising all six competitive levels distinguished within women's gymnastics, took part in the study. The coaches ranged in age from 16 to 57 years, and had coached between 1 to 35 years. Almost all coaches had NCCP certification, the majority at level II or III. Three quarter of the coaches was female, the rest was male. The majority of the coaches had themselves been competitive gymnasts in the past. All coaches had at least a high school diploma, and many had either completed a college or university degree or were working on such a degree. The coaches had experienced a wide range of educational events regarding the care and management of injuries, varying from first aid courses, athletic injury clinics to specific individual experiences. The personal injury history of many coaches included at least one ankle injury, and for more than half of the coaches an experience of competing with an injury. The latter had been neither a good nor a bad experience for most coaches, but had been a good experience for some and a bad one for others. Having missed an important competition because of an injury was also not uncommon in the coaches' personal history. Furthermore, more than half of the coaches were still to some extent affected by a past injury.

More than 80% of the coaches indicated that they were the ones who would make the decision as to whether or not an injured athlete could participate in a competition. Most coaches did not think that family physicians were knowledgeable enough with regard to injuries in competitive gymnastics to give appropriate recommendations, therefore, they would often advise the athlete to see a sports medicine specialist or physiotherapist. A few clubs had arranged a system in which the athletes had direct access to such a person, but for the majority of the clubs the athletes needed a referral from the family physician for more specialized care. Coaches of these clubs would often recommend a specific doctor, physiotherapist or clinic that they knew personally and had good experiences with.

PART II: Qualitative analysis of the coaches' decisions

Introduction

In responding to the scenarios almost all the coaches provided information as to why they made their decision the way they did. Sometimes they seemed to be actually 'thinking out loud', other times they merely provided information on what they would do and arguments regarding why they would do it that way. This section encompasses a qualitative analysis of the verbal responses that the coaches gave in reaction to the scenarios as well as the comments that they made at the end of all the scenarios or at the end of the interview. The analysis was aimed at answering the following question: What do coaches take into consideration when they decide whether or not an injured athlete can participate in a competition? What do coaches think about when they have to make this decision?

The thoughts of the coaches as related through the telephone interviews contained not only references to various factors that would impact on the outcome of their decision ("considerations"), but also alternative options regarding the decision outcome (competing versus not competing) and strategies that they would use in the process of making the decision. Below, the decision alternatives will be described first, followed by the strategies used to manage the decision process and the factors that the coaches reported considering in their decisions.

Decision outcome modifications

Rather than deciding not to let the athlete compete at all, a majority of the coaches opted in several scenarios for what might be called a 'compromise solution', i.e. they would let the athlete take part in the competition, but they would make some adjustments, or modifications, to minimize the stress. These modifications could be categorized into four types: (1) only competing one or two events, that is, doing bars and/or beam, but not all around, (2) watering down the level of difficulty of the routine (e.g. making lesser tumbling lines, modifying or removing the dismount), (3) providing good support for the foot, e.g. taping it well, doing a good warm-up, (4) going event for event, "see how it goes" and pulling her out of the competition if necessary. A few coaches were asked what the signs would be that would make them decide to take the athlete out of the competition. Their answers indicated that they would mainly look for signs of pain, which could consist of (a) limping a lot, favouring the ankle, (b) performance decrement (e.g. *"only being able to perform one of two vaults"; "she is not showing off, you can see a definite weakness"*), or (c) atypical emotional responses, such as crying, being upset or acting out of character.

The reasons that the coaches provided for their choice to have the athlete compete but with some modifications varied from the argument that *"a qualifying meet is important enough to at least try it"*, to the consideration that *"the athlete can use the meet for experience or training"*, to a concern about *"not wanting to let the athlete down"* after she had worked hard and/or had been looking forward to the competition, not wanting to deprive the athlete of a social experience. Some selected quotes, illustrative of the statements that the coaches made regarding competing with modifications, are presented in Box 4.2.1.a and 4.2.1.b. The statements shown in this box, and in any of the other boxes included in this chapter, are all selections from the interviews representing the statements most commonly made, as well as the variety found among the statements made.

MODIFICATIONS

Do only one or two events

* she would compete on a couple of events, where she is not using her foot, say bars. If her parents really wanted her to go for some of the experience, or if she is really into it, then I would say that maybe the events that she does not need to use it so much, even just bars, do that event and go to the meet. But events where she is guarding her foot consistently, then we would say, no we don't do those things.

* And if I saw significant compensation for that injury while she was in her warm-up, then I would likely not allow her to do those events. But she may still participate in events that the injury is least limiting, uneven bars and beam.

* I think I would let her compete bars and beam, but not all around.

* Probably about a 3. Because I might consider doing bars or ... probably not floor and vault, but possibly bars, where there is not a lot of stress on the ankle, modify it.

* I would consider her just doing one or two events, just for the fact that it was an away meet and she was really pumped up on going, and I think it would be a real let down for her not to be able to go if all of the other girls got to go. So if she could compete in something like bars and downgrading her dismounts or whatever, so that it is not as bad a wear and tear on her ankle, I think it would be all right.

* If it is an invitational, then I have the option of not competing on all 4 events. So I might let her compete on bars. And if it looked like she was not going to be able to land her dismount, then I would just remove the dismount.

* In that situation what I would do is have her compete on the apparatus that she could, which could be beam and bars. At an invitational, you would not have a problem doing that. So, if I felt, watching her routines, that she could do most of the tricks in her beam routine, bars... maybe the dismount would have to be altered, depending on what kind of dismount it is, or maybe a crashpad could be used for the landing, but those two apparatuses, the chances would be very likely that she could compete, and leave the other two out.

Water down the routines

* Probably about a 7. I would not get her doing her full difficulty though. If she is still limping and has limited range and some swelling, I mean, it is still not completely healed up. I would get her to compete, but I would water down her difficulty probably.

* Even if they are try-outs, still, you can avoid the very very difficult moves, [..] you can avoid these, and you can try to work very clean. Water down the routines, exactly, and then you can make the team. And if it hurts so hard... you try your best on the vault and just go for one vault; but that one to be very good. So, and then bars, that is pretty good; you can ask the judges "She was injured, may I put the foam mat for the landing?"

* Maybe take out a few of the harder skills, if they are not within... still keeping the routines up to the normal standard, but maybe watering down the routines a bit.

* let them give it a try. You may take out moves that are a little more stressful on their ankle. You may tune down their tumbling or have them do some of their easier moves instead.

* if it is a meet where there are not many athletes competing, and she has a good chance, even though she is injured, if she can place in the top 8, or even 8th or just below that, 6th to 8th, I would put her in, just to see... again, with watered down routines. Keep everything clean, and she would still have a good chance.

* I think I would say 10. Very likely. It is just a moderate injury, and with the younger kids and her level, we can always change her routines around, so I think it is important for them to get the experience, and to do their best.

Box 4.2.1.a. Selected quotes regarding modifications; decisions to only compete one or two events, or with watered down routines.

MODIFICATIONS

Taping, support

- With an injury like that you can tape it up. The pain won't go away, but they can still go and try their routines.

- I don't know... I would say yes and no. Yes if she really can make it, and tape the foot good and everything..

- I would tape the ankle really well, and I would let her compete. Probably about a 7. A likely situation.

- I would just make sure that she had warmed up really really well, and that she had support for her foot, and go to the competition, do her events and see how it is reacting during the competition.

- There is lots of tape. I would probably tape it twice though. Tape it, and then retape it after she warms up.

- I would tape it up really good, and I make her do other kinds of exercises to keep her fitness level up.

- I would not want her to compete, but she might be big... I would tape her ankle really well so she could not move it.

- if the doctor thought by three weeks she would be practically healed, I would tape it and let her compete.

- I would say the chances are pretty good; let's go for 8. Simply because ankles are pretty easy to guard, with taping and tensors, so..

See how it goes, pull her out if necessary

- About a 7, likely. That would be depending on how the warm-up's go and how she feels during the warm-up. And then we'll take it from the warm-up. and if she does not feel she is ready, we'll just pull out.

- And this is a moderate injury? I think I would let her compete, an 8. And then pull her if needed.

- Is there a half and half here, like could I say: put her in for a while and if it gets any worse take her out? Like a 5? Yes, I think I would have to go halfway, and just watch it, depending on which event was first, of course; if it was bars it would be no problem, except of course the dismount. But tumbling...if things are not going well in that competition I would pull her out.

- I would let them go if they thought they could handle it, but again... if it was too much, I would definitely pull them out of the meet, if I would see that there was no way..

- Probably I would play it by ear. We would definitely be going to the meets, and definitely competing on certain events. How many events would be up to the athlete and myself during the meet, on what they can handle. It would be discussed prior to it and we would look at... we would start with definitely bars, second decision would be beam, third decision would be vault, fourth decision would be floor, in that order.

- But if they are really eager to compete and they have worked 6 months just for this competition, I would allow them to do and try their best, and if something happens during competition, of course I would pull them out.

- I think probably a 6. In situations where it is not severe, depending on how they practice, I usually leave it up to them whether they want to compete or not. And then throughout the course of the competition, if they find that it is bothering them, then I pull them from the remaining events.

- if I see any problems arising I would pull her out right away. But I would give her a chance to go there.

- So, I would say 'yes she may compete', however, I would also say to her that I have total control during the competition to pull the plug, whenever I feel that it is in her body's best interest to basically withdraw from the competition.

Box 4.2.1.b. Selected quotes regarding modifications; decisions to compete with the ankle taped or otherwise supported, or to try competing and withdraw if necessary.

Alternatives to competing

As an alternative to competing, some coaches indicated that they would take the athlete to the meet to watch or to help out. Another alternative that was mentioned was the option of petitioning. By submitting a medical petition at a qualifying competition, there would still be a chance that the injured athlete might be selected for the team. The AGF women's program information handbook only lists this option for national stream athletes in the qualifying round for the National Championships, and indeed this alternative was only mentioned by coaches who were coaching or had coached elite level gymnasts. One exception was a coach who had never coached beyond class I, but who had coached higher competitive levels in other sports. Some examples of remarks regarding petitioning can be found in Box 4.2.2.

ALTERNATIVES

Petitioning

* Yes, is the meet petitionable? Because sometimes if the child has placed or you can present an argument why she should be on the team, they don't have to compete, they can be petitioned on to the team, and then that would avoid that situation completely; all you would have to do would be to present her records and the board would decide whether or not she would be or not.

* I definitely would have them checked out on the day of the competition, if it was available, by a physiotherapist, to check it out and give a final opinion. I would also do the petitioning if that is... usually for these though, you know, for the important qualifying meets. If they are a good athlete, like the best, they could be petitioned in without having to even compete. So that would even make the likeliness zero. But... let's just say they could not petition, it would be 3, still really really low.

* I would say a 5 if it was petitionable. If I could petition her and make sure she was on the team I would not even bother competing her. If she was that well in the standings I would just petition her in. If she could not be petitioned in, then I would probably compete her, she would probably still make it.

* In that situation I guess I would go on how she is feeling. It would probably be towards a 7 again, because of me wanting her to be there. If not, I would petition her. I can petition; so I would leave that option too. If she is not quite full and the petition was accepted I would let her miss a meet. So I would go 5.

* That is a tough one. It just depends on the situation again. If we could petition it, and if we could I would say no. If we could not petition it, then I might water down the routines and see...

* No, zero. I would suspect that if she was one of our best athletes she is probably one of the best in the province, and we would easily petition her through. Or we would take the chance that they would not accept the petition and we would go as an independent or something.

Box 4.2.2. Selected quotes regarding decisions not to compete but to petition instead.

Managing strategies

The answers to the scenarios revealed a number of strategies that the coaches might use in order to manage the process of making the decision. By employing these managing strategies they appeared to try and establish a better grasp of the situation, so that the final choice would become easier to make. There were four different types of strategies that they applied to this end: (1) obtaining information, (2) sharing the responsibility of the decision (or even totally delegating it), (3) timing the decision, mostly by either making it earlier in the week, or by delaying it until the day of the competition, and (4) talking with the athlete and/or her parents.

Obtaining information

In the process of making their decision, most coaches noted that they would try to collect more information, either from the medical community, the athlete herself or her parents, or any combination of these three. Information from the medical community about the nature and severity of the injury, as well as advice regarding the desired activity level of the athlete, might be acquired via the athlete and/or her parents, or, as a few coaches indicated, through personal communication with the doctor or physiotherapist. The latter might be a two-way communication in which the coach would use the opportunity to educate the doctor about gymnastics and the types of stress that the athlete would put on the ankle. Consulting with the parents was often quoted as "see what the parents think". The athlete herself would be used as a source of information relative to her subjective experience of the injury, and her opinion about whether or not she thought she could compete.

Sharing responsibility

Another managing strategy employed by the coaches was to find a way to somehow share the responsibility for the decision. This sharing might be done with the athlete and/or her parents, sometimes a head coach, if one was available, or, in some cases, with the doctor who treated the athlete. The extent of the sharing was not always clear. Sometimes coaches just said "we make the decision together", sometimes they would leave the decision totally up to the athlete and/or her parents. A number of coaches seemed to follow the guideline that the older the athlete is, the more input she will get into the decision making process; however, most of them did not qualify how much of the input or in what form.

In some cases the tendency to leave the decision to the athlete and her parents appeared to be rooted in an attitude of powerlessness, in which the coaches felt that it did not matter what they decided, because if the parents really wanted their daughter to compete there was not much that they could do to prevent it. In other cases the decision to leave the choice to the athlete herself was accompanied by a cautious attitude which made this decision conditional; the athlete was only allowed to make the decision as long as the coach felt that it was a reasonable decision and would not jeopardize her.

Timing

Several coaches commented that they would not make the decision the night before the competition. Some would make the decision earlier than the night before, between a week and a couple of days before the meet. A variety of reasons were mentioned for making the decision earlier. A few coaches said it was a club rule that the athlete had to show full routines one week before the competition. Others said that leaving it to the last night would be too hard on the athlete, psychologically. One coach noted that the club had to pay for the entry fees, and had to know who was going to compete for that reason. Another coach felt that she might be under pressure herself by Friday night and then make an emotional rather than a rational decision. A last reason given was that one would want to know earlier than the night before what the risk of reinjury was and make the decision on that basis.

The coaches who reported that they would sometimes make the decision later, usually did this on the day of the competition, during the warm-up. Delaying the decision until the day of the meet was mostly done to ‘give the athlete a chance’, either because the meet was important, or because it was the only occasion for the athlete to get some experience before an important meet. One coach mentioned that it would be an opportunity for the athlete to see that she could do more than she thought. Another coach indicated that waiting until after the warm-ups gave her and the athlete a chance to check out the level of the other competitors, and then they could decide whether staying in the meet would be beneficial for the athlete.

Talking

Talking with the athlete, and sometimes with the parents, was a strategy that would be applied for two purposes. In cases where they left the decision to the athlete and/or her parents, coaches would still make sure that the athlete and her parents were aware of the risks involved, and often they would try to discourage the athlete from competing. Talking might also be used after the decision had been made; then it would usually serve to explain or justify to the athlete why she could not compete if the decision was negative, or to assure that the athlete had realistic expectations about competing if the decision was positive.

Considerations and arguments

In conjunction with strategies used to manage the decision process and modifications to full competition, the coaches also mentioned a number of factors that they would take into consideration when making the decision. These factors included the four parameters that were systematically varied in the scenarios: ability and age of the athlete, importance of the competition and severity of the injury. They also included some factors that were part of the scenarios, but were kept constant, such as the amount of training that the athlete had been able to do, and the athlete's claim that she was 'fine' and wanted to compete. In addition, some topics were raised spontaneously, in particular, personal characteristics of the athlete, the experience the athlete would have, the doctor's recommendations, the risks of competing, the time of the season and the competitive level of the athlete. The coaches would often use these factors as an argument to support their decision in one direction or the other, that is, either leaning towards competing or leaning towards not competing.

Ability

The ability of the athlete was indicated in the scenarios as 'an average athlete, not expected to place in the top eight of an important qualifying meet, even with her best performance' and 'one of your best athletes, who would almost certainly place in the top eight if she did perform well'. A few coaches indicated that average or best did not make any difference in their decision making. For most coaches however, the scenarios generally yielded different considerations depending on whether they contained an average or a best athlete. Although the considerations associated with average athletes included both positive and negative viewpoints, the negative viewpoints seemed to dominate. The most common comment made about an average athlete was that if she was not expected to place or to do well, it was not worth competing her and risking aggravation of the injury. Some additional considerations leaning towards not competing included: (a) average athletes tend to be psychologically less capable of handling an injury, they can not concentrate as well and therefore they would be at a higher risk of reinjury, (b) average athletes might be heavier and for that reason be at a higher risk for reinjury, and (c) young average athletes can always improve and become one of the best athletes later, it is not worth risking their future. In a few instances the considerations pointed in the direction of competing, for example if the meet would be one of her goals for the year. One of the coaches indicated that an invitational meet might be more suited to an average athlete, thus it would be an opportunity for her to have a positive experience.

If the ability level of the athlete was high, a decision leaning towards competing was often supported by the argument that a best athlete would have a good chance of doing well and/or that the qualifying competition was important to her, and one did not want to spoil her chances of making the

ABILITY

Average

M8AQ 1 ... and if she is only on her best placement between 8th and 10th place, she would not make the team, regardless. So why would you even think of risking her injury if she would not even make the team with her best performance. Zero to one then, I would **not** want her to compete.

M15AQ 4 ... And this is an important meet? Probably a 4. If it was an important qualifying meet, and even at her best ability she was not expected to place, I would not see the point of putting her at the risk of injuring herself further and then being out for the rest of the season, for one meet. Even though it is important... I would probably not.

M8AQ 0 ... Can you tell me again, what kind of athlete is this? *She is of average ability, that means you would not expect her to place in the top 8 or 10.* Well, then she does not compete, if she has no specific goals. If she has no specific goal to reach... you said Interprovincial Cup try outs? If they are try-outs, and she does not make the team, and she has this kind of injury, why to compete? No.

M8AQ 0 ... And if she is not going to place in the top 10 anyway, I would not allow her to compete.

Sv15AQ 5 ... It is severe and it is an important meet, but if I know that she is not going to make it in the top, then, why push it any further, I guess. If it was a good athlete and she got a chance, I think every coach would want the athlete to do it... That is a real hard question really. But... she is just an average athlete... I don't know. Actually, I'd probably say about 5.

Sv15AQ 4 ... If she was not expected to place, then I would not put her in. It would ruin state to think that she was not as good as she thought, like she might think she was worse than she really was, that she does not think that she is that good. And in case she injured it more.. so that she would not be able to improve her skills. *So, if she injured it more she would not be able to get better, because she would be hurt and not be able to train?* Yes.

M15AQ 7 ... On the moderate one I would say 7. I would say that those that are not expected to do very well need it more than the most... need to be involved more than the ones at the top, the more experienced ones, they personally, for their own self-worth, need it more than the injury is going to..., you know, more than one competition is going to hurt a slight sprain. Psychologically they will need it more.

M15AT 2 ... Just because if it is an invitational, and if she is just average, she may not be able to go to that many qualifying meets, and that sort of things, so invitationals are about the only things that she does get to probably excel at, so you want to try and get her to those if you can.

M8AT 5 ... That one because if she is of average ability, then that is probably one of the competitions that she will do her best at. Because the level of competition is not as high. So it would be a positive experience for her.

Best

Sv8BQ 6 ... Because you say that she has a much better chance of qualifying.She needs to go there. The other one probably wouldn't have made it anyway, so why take the risk. Her, you have to look at ...there has to be some risk in there that they have to be willing to take.

Sv8BQ 4 ... About a 4. Basically the same reasons as before. If she **is** a good gymnast and has potential, you don't want her getting injured at a young age, because it will stay with her for life. And... why put her through the pain, you know...

M8BT 2 ... She is one of the best and it is only an invitational. There is no need to stress her body out any more than she has to.

M8BT 5 ... You don't want to wreck your best athlete on an invitational.

Box 4.2.3. **Selected quotes of comments made regarding ability level in response to the scenarios.**

team. The opposite decision would be supported by the argument that one did not want to risk aggravating the injury for an unimportant competition or when the athlete was young. Selected quotes illustrating the range of arguments raised in relation to average and best athletes are listed in Box 4.2.3.

Age

The two age groups represented in the scenarios were 8 year old athletes and 15 year old athletes. Most considerations mentioned in association with scenarios containing 8 year old athletes were geared towards not competing. The general tenor of the comments was that 8 year olds still ‘have a long way to go’, that there are lots of competitions coming up, and that competitions at this age are not really important, so why take the risk of aggravating the injury or even causing permanent damage? An additional concern raised was that at 8 years of age athletes do not know themselves well enough to be able to provide reliable information about the amount of pain that they are feeling or about what they can or can not do, and therefore, they could not really be used as a source of information. It was also suggested that 8 year olds would be more likely to get confused ("*a bit spinny*") during the competition and reinjure themselves, because they did not have much experience in competition, or they might still be a bit shaken from the sprain. A few coaches noted that they would not compete 8 year old athletes, regardless of whether they were healthy or not, because they considered 8 years to be too young to be participating in a competition. However, there were also some coaches who said they would consider letting the athlete compete because the experience might be worthwhile for her. Box 4.2.4 provides some examples.

Most considerations mentioned with respect to 15 year old athletes were the reverse of the ones listed for the 8 year old athletes and tended to support a positive decision. The two main arguments that were presented stated that (a) at 15, the athlete was getting near the end of her competitive career and this might be one of her last chances to take part in a meet, and (b) at this age the athlete would know her body better, knew her limitations and what she could and could not handle, therefore, if she thought she could compete, the coach would probably let her. It was also noted that because a 15 year old was more mature, one could communicate better with her, and she could or should have more input into the decision. One argument was mentioned against letting a 15 year old compete injured: "*They are still young, even at 15; they still have lots of years to go, you don’t want to risk permanent damage*".

Interestingly, some opposing views appeared in the coaches’ responses regarding the physical risks of competing with a sprained ankle in relation to the age of the athlete. Some coaches believed that the physical risks were higher for an 8 year old, whereas some others believed that they were higher for a 15 year old. Arguments used to back up a decision leaning towards competing an 8 year old athlete were that 8 year olds tended to be lighter and therefore the strain on the ankle would not be as much,

AGE

M8AQ 2 ... I would say about a 2. She is 8 years old, so she has got a long ways ahead of her, and if you set her up to have something that is a problem now that is going to last for a long time.. it is nothing of any great importance, and she is going to have a lot more important and bigger meets down the road, that she will remember a lot more than something that she did when she was 8. It is not worth all those things.

M8BQ 5 ... I think 5. Because she is young enough that she could have the opportunity again. But maybe let her try a little bit, one or two events, and see how she was and..

Sv8AT 4 ... It is not that important, especially at that age. She can do it again, lots of times.

M8AQ 1 ... With an 8 year old I would still say no, because 70% is a lot. What we are doing when it is down to 70%, is we are putting an immense amount of stress on the other knee and the other ankle. And... even with an 8 year old, she is going to be doing some fairly difficult stuff where she is chancing damaging the other leg, other ankle, other knee. And I am just not willing to take a chance like that with an 8 year old. With a 14, 15 year old who has gone through puberty and is a little bit stronger , I might. Especially if they feel that they can handle the pain, because they know their bodies a little bit better. But with an 8 year old who is just eager to do something and not thinking in long term as much, I would still say no. I would put that down as a 1 or a 2, 1 probably, very low.

M15AQ 5 ... I would have a discussion with her first and see... At that age they know how painful it is or how bad it is. I would probably say.. depending on what the child said and how... I would say probably about a 4 or 5. The child is intelligent enough at that age to know how bad it hurts...

M15AQ 7 ... Does she want to compete? I would say about a 7. Simply because she is 15 and she knows her pain level, she knows how much she can take, and I am sure that if she wanted to compete, if she felt that she could compete, she would know better than anybody else.

M15AQ 9 ... Pretty likely; 15 is getting kind of old, not over the hill or anything, but for gymnastics... they lose interest when they are about 16 if they are not getting anywhere; it is probably going to be one of her last few competitions. It is not a severe injury, and she says it is fine.... sure, 8 or 9, 9.

M15AQ 5 ... A 5. Just based on age and possibly altering routines and what not. If she really wanted to compete, I would let her. She is old enough to decide for herself. If I had coached her all along, hopefully she has an awareness of her body to the degree that... I know my gymnasts do, and sort of respect for their bodies, so... The kids that I teach who are around 15, they know whether or not they can compete. If a situation arose where it was being aggravated or whatever, then there is no problem withdrawing from the competition. But I would give her a chance if she really wanted to.

M15BQ 3 ... O God.... 15 years old... You know I think of 15 and I think that a lot of times kids might be retiring after this.

Sv15BQ 1 ... But we are still down at a one. We are going to spend more time thinking about it and talking about it, but the answer is still probably going to be no. As they get older, the amount of discussion gets more. Because at some point they have a lot more input in the decision. So... if they can convince me, then maybe.., but they are going to have to be pretty powerful arguments, and the situation has to be extremely important, like Olympic Games or the World Championships, to risk anything further.

Sv15AQ 0 ... With an 8 year old it would not be such a hard decision, but with a 15 year old I think it would be, because they are taller and they are heavier, and they tend to over-compensate more than an 8 year old.

Comments 44 05 Age is a big factor I think. I mean... when they are so young... if it is an important meet.. they have a lot of time to do a lot, so I am not too worried about them missing out on anything. But when they are 15, you are starting to run out of time, when you are a gymnast. So that kind of makes a little bit of a difference.

Box 4.2.4. Selected quotes of comments regarding age made in response to the scenarios

and that 8 year olds healed faster. Conversely, an argument used in conjunction with a decision leaning towards not competing an 8 year old athlete was that she was still growing which made the risk of growth plate injuries higher. An argument used in favour of a 15 year old competing was that she would be more conditioned and in better shape. On the other hand it was noted that a 15 year old would be taller and heavier and might compensate more for the injury, therefore, competing would be less likely.

Meet

The importance of the competition was expressed in the scenarios by taking 'an invitational tournament' as indicative of a low importance meet and 'an important qualifying competition' as indicative of a high importance meet. Most considerations of the coaches reflected this distinction (see Box 4.2.5 for some examples). Generally, invitational tournaments were considered not to be important, which either meant that participation was seen as an unnecessary risk ("*Save the ankle*"), or that there was the flexibility to just "*Go in and see how it goes*", or to only do one or two events. Sometimes coaches did attach a degree of importance to invitational tournaments, for example, if they saw them as training events, as an opportunity to gain competitive experience, or as a chance for the athletes to "*Go out and have fun*". Because tournaments were considered less important, oftentimes the timing of the meet would become a consideration. If the tournament was early in the season, some coaches would decide in favour of competing, arguing that the athlete needed exposure to the judges, while other coaches would decide the opposite, arguing that she still had lots of time to catch up. If the tournament was shortly before an important qualifying competition, some coaches contended that it was better to let the injury heal and save the ankle for the important competition, whereas other coaches said they might allow the athlete to participate in order to gain some competitive experience, particularly if it was later in the season or if it was the only invitational before the qualifying meet.

Qualifying meets were generally considered important events, and the statement "*This meet is important*", was frequently used as an argument in favour of competing. Sometimes coaches specified why they thought these meets were important, for example, because the rest of the athlete's season depended on it, or because it had served as a major focus in training. However, many times the fact that the meet was important was simply stated, reason enough to give more consideration to the possibility of competing. One consideration associated with a qualifying meet was that in order to make the team, the athlete would have to compete all around, therefore, leaving out one or two events would not be an option. Even with qualifying meets the timing might be a consideration, as is clear from questions like "*Is it **the** most important qualifying meet?*", "*Is there another qualifying meet?*", "*Can the athlete participate in the same meet next year?*", "*Is it the final meet of the year?*", "*How long of a lay-off is there after this meet?*" and "*When is the next invitational - that would be more suited for an average*

MEET

Sv8BT 2 ... In that situation what I would do is have her compete on the apparatus that she could, which could be beam and bars. At an invitational, you would not have a problem doing that.

Sv8BT 5 ... A lot of it comes down to philosophy [..]. I think an invitational is as important and is just as a learning experience as a qualifier. So we... as much as the province likes to put pressure on Zone meets, if the kids know that every meet is important, and every meet can be fun, you can still have fun at a zone meet, or at a qualifier, Provincials or whatever. So if you weight all the competitions equally, you don't have that problem; because that is the coach's problem.

Sv8BT 0 ... It is even less. If there is anything negative there... because if I would not let her compete for a high end important competition, definitely I would not let her compete for a non-important invitational. Invitationals in gymnastics are so common that you could have one every weekend. So it is just not worth it, there is no reason.

Sv8BT 0 ... Well, if it is not a qualifying, it is not going to benefit her anywhere. So I would say there is no use in having her perhaps injure it more than what it already is, and then not having her compete at maybe a qualifying meet. I just don't see there being any point in taking that risk.

M15BT 10 ... then I would allow her or disallow her to do floor. But the chances of competing... I would say 9, actually, put a 10 there, very likely. *So it is more likely than the qualifying competition?* Yes, because with the qualifying competition you have got other stresses involved and other pressures involved, whereas at an invitational, we have relieved a lot of the stresses and pressures, plus the fact that we don't need to go all around; that relieves a lot of the stresses.

M15BT 2 ... No, I would not; it is only an invitational, it is not important, so no.

M8AT 9 ... I would say the chances of her competing are good, like in an invitational meet where there is low stress and doing individual events, perhaps just one event or two events. I am going to be taking off a lot of the stress that I would be seeing in a higher pressure meet or in a higher importance meet. And again it all comes back to what we talked about earlier, is there a meet in a week or two weeks, is it the only meet that she is having in the year, so there is more than just this individual meet. I want to look at what other meets has she got coming up [..], that is always a consideration.

Sv8BQ 61 13 ? .. But if it was really important, a really important qualifying meet, it could mean that if she does not make this, she could be out for the rest of the season.

Sv15AQ 0 ... Again, whether it is a qualifying meet... I try not to let those things influence my decisions. If a decision to compete is wrong, I feel it should be wrong regardless if it is a qualifying meet or if it is a nothing meet. That should not be the basis for a decision. I think that is sometimes where coaches get caught. "Well, this is an important meet". The question is not whether the meet is important, it is: what is that meet doing to your athlete, and what kind of damage is that going to be doing to the athlete. That is the question, the meet should really be irrelevant, whether it is nationals or whatever.

M8BQ 5 ... 5, depending on warm-ups, and because it is important, and she could probably do well. And we could tape it.

M15AQ 4 ... A qualifying meet would be all around... It really depends. I have had gymnasts who competed some events before. If you want to look at it as all around or all events, then it is unlikely that I'll let her compete.

Sv15AQ 6 ... the qualifying meets are usually the ones that we try and peak for, even if they are of average ability, so... usually the kids are really geared up for that meet, so.. If they were able to, we would usually try and allow them to compete. Of course we would again modify the routines...

M8BQ 5 ... I've got to give her more of an opportunity to go with a qualifying meet.

Box 4.2.5. Selected quotes regarding the importance of the meet, made in response to the scenarios.

athlete?" So it seems that some coaches would look at the rest of the season to weigh how important this qualifying competition really was for this athlete.

There were a few coaches who noted that they realized that qualifying meets were generally considered important, but said they tried to not let the importance of the meet influence their decisions.

Injury

The state of the injury and its readiness to be used in competition had to be inferred from the description of the injury symptoms in the scenarios. The considerations associated with the injury therefore, were based on beliefs about how these symptoms would affect the risk of aggravating the injury, or the ability of the athlete to perform. Interestingly, the same descriptions led to both positive inferences, increasing the likelihood of competing, and negative inferences, leading to a lower likelihood of competing. For example, some coaches believed that enough time had passed for the injury to heal sufficiently (one week for the moderate, three weeks for the severe injury), whereas others thought that one or three weeks was not enough time for adequate healing to occur. Furthermore, for some coaches the fact that the injury concerned the ankle suggested that the injury was not that serious, because "*ankles can be taped*" (one would be more cautious with a knee injury), whereas others argued that the ankle is a joint, and therefore one should be careful with it. The belief that the injury was 'only moderate' and thus not severe enough to risk serious damage or to have a negative impact on the athlete's performance, was associated with a higher likelihood of competing. Some coaches would go beyond the information provided and seemed to add assumptions that would place the symptoms in a favourable light, for example by commenting "*if she has no pain*" or "*if she can bear weight on it*", and by doing so steering their decision towards competing. Generally, decisions leaning towards not competing were accompanied by references to the presence of symptoms like swelling, limited range of motion, pain, limping and favouring of the injury. Lack of training or weight bearing activities also tended to influence the decision towards not competing. The fact that the injury was called 'severe' was used by some coaches as an argument against competing as well. Examples of quotes regarding the impact of the injury on the decision can be found in Box 4.2.6.

Risks

Where coaches made reference to the risks associated with competing on an injured ankle, this happened mostly in terms of "aggravating the injury". The risk of the injury becoming chronic or doing permanent damage was also mentioned, as well as the risk of sustaining an injury to the opposite leg because of over-compensation. Having to miss more training and competitions as a result of aggravating the injury was also noted as a risk. If the injury was moderate, the physical risks were sometimes

INJURY

M8AQ 5 ... I guess I would say... if she wanted to compete: does it hurt? If it hurts then no, if it does not hurt then yes. So I would say about a 5. If it hurt I would not force a kid to compete.

M8AQ 0 ... She is young, so she is still growing, and you said she still had swelling in her ankle, and that obviously... she is not recovered enough to keep doing gym. And you said that she is guarding her foot, which is a very large indication that it is not a full range of motion, not full strength, and she is limping when she is landing, which is a true indication that she is not ready to go on. So it is just not safe for her. There could be more damage if she goes out and tries it again, so...

M15AQ 8 ... Well, if it was not a severe injury and she feels good, then of course she can compete.

M8BT 7 ... I would say about a 7. It is just a moderate injury... The way that we treat moderate injuries is... they can be very... it is bad to say 'helpful', but they teach the athlete, and they tell the athlete how much they can take and how much they can't take. If it is just a moderate injury, there is going to be some pain and to add to that stress... and personally I don't think it is going to hurt them if they try it.

M15BQ 6 ... it was a one week sprain, so just a moderate, so it might have had time to heal,

M15BQ 7 ... If it is a moderate injury I would let her go.

M8AQ 3 ... Unlikely. We still have swelling, it only happened a week ago. If there is still swelling and she is still limping, then every time she is moving she is causing more damage. So she is not in the mending phase too well. In my program she would probably be on cryo, she probably would be doing that icing and exercise program at this time and still probably would not have much strength back after only a week. And if she can only do 1 or 2 elements, based on my experience - I used to coach up to national level for women's gymnastics -, that is not going to take her too far through her routine; 1 or 2 elements on the beam or whatever, and you are starting to ask for ... a limp or a stagger and she could be on the ground.

M8AQ 0 ... No. There is no question about that; I would not let her go. If she is not recovered fully, and if she has got to jump and give her best, and have to use all the power and maybe it is going to be worse after the competition again than before. I would not want to take that risk.

Sv8BQ 3 ... I would say highly unlikely, she would not compete, 3. I think a severe sprain takes longer than 3 weeks to heal, and there is no point in doing any more damage. I know young kids heal faster, but...

Sv8BQ 2 ... unlikely that I would place the athlete in a competition. Given the same reasons that I gave before. I would... however the scale... it would be a tougher decision. Because it is one of the top athletes and the injury happened 3 weeks ago and the athlete has done exactly how they should take care of it. However, it bothers me that the athlete still has swelling, still is favouring, and to me could injure that side even more severely, that could ruin her chances of competing...

Sv8BQ 0 ... Zero. If she has not been able to train all her events, and do her things, it is not worth risking the injury just because she has not done anything for such a long time and obviously when she is limping when she walks into the gym, her foot is not ready.

Sv8BQ 7 ... So it has been 3 weeks... I would probably say about 7. If she is able to walk on it... she is limping, but I have limped before and still competed. The adrenaline, once you get competing, takes everything away. So if the doctor says after 3 weeks she should be okay...

Comments ... I just think I would be very cautious about anything that is severe, because even though it is 3 weeks later, they haven't been on the equipment that much, so you go to a competition, and you have adrenalin going and the whole bit, there would be a high chance of them injuring it again, for sure. The moderate does not bother me too much, because I think that any kid knows enough for a moderate injury to be able to deal with it.

Box 4.2.6. Selected quotes regarding the injury, made in response to the scenarios.

deemed very low (e.g. "*It is just a moderate injury; I personally don't think it is going to hurt them if they try it*"). Although most of the perceived risks were physical in nature, some coaches made mention of psychological risks as well, stating that if the athlete did not compete as well as usual it might undermine her self-esteem or self-confidence. "*Why going to a competition and not do well, and maybe ruin her confidence, whereas if you could wait she might be fine the next time.*", "*It could be really discouraging to her as well. If she did not do how she could have if she was not injured. I just think it would bring up a lot of other sort of mental pain.*"

Athlete's willingness to compete

The athlete's desire to compete was kept constant throughout the scenarios, i.e. she wanted to participate in the meet. This willingness to compete regularly appeared in the coaches' considerations. Sometimes coaches explicitly stated that the athlete's wishes had no influence on their decisions ("*No, regardless of what she wants*"), sometimes they said they might consider competing her if the athlete really wanted to, but that they would probably try to convince her not to compete; in a few instances it was noted that if the athlete was very keen one would be less inclined to let her compete, because her keenness might mask the extent of the injury. Quite frequently, however, the athlete's desire to compete would influence the coaches' decision towards a greater likelihood of competing, although it would often be made conditional on another factor. These coaches would say something like: "I would let her compete (or at least consider it) if she was really keen, and if.... "*she puts up a big fuss*", "*it is her last year*", "*it is a qualifying meet*", "*I did not think there was much risk of reinjury*", "*she favoured the ankle*", "*she feels she can handle it*", "*it was really important*", "*the doctor says she is okay to go*", "*she is an older athlete*", "*she has been working moderately on it*", etc.

On a couple of occasions the athlete's willingness to compete was equated with the belief that she thought she could compete, and this was then used as a source of information favourably affecting the decision in the direction of competing.

Performance level

One of the considerations that came up spontaneously in the coaches' responses was the quality of the athlete's performance with the injury. Some coaches concluded from the description of the injury given in the scenarios that it would be unlikely that the athlete would be able to do her skills well enough to get her through her routines, or to make it worthwhile for her to compete. This would reduce the likelihood of competing, or lead to the decision to only compete bars and beam. Other coaches included performance-related if-statements in their answers, followed by the conditions in which they would let the athlete compete and conditions in which they would not let her compete. The likelihood of competing would increase, for example, if the athlete could perform her routines the same way as before or close to her previous level, or if she could do the minimal difficulty that was required for the competition, or simply "*if she can land without buckling under*". The likelihood of competing would decrease if the athlete was not able to perform up to these standards.

Personal characteristics of the athlete

Another factor that was not described in the scenarios, but that appeared in the coaches' responses was the personal make up of the athlete. A number of coaches stated that they would make different decisions for different types of athletes. The personal characteristics that they used to distinguish between athletes can be grouped into five categories: (a) keenness or motivation, (b) the athlete's mental state or ability during competition, (c) self-esteem, (d) pain tolerance and mental toughness, and (e) physical characteristics. Similar characteristics however, might influence different coaches' decisions in different ways. For example, a highly motivated athlete who could push herself was for some coaches the athlete whom they would allow to compete, as opposed to an athlete who was not that motivated, whereas other coaches were more inclined to let the athlete who did not push herself compete than the one who did. On a similar vein, for some coaches, athletes with high pain thresholds were the ones whom they would allow to compete, whereas for other coaches these athletes would be the ones that they would hold back.

Generally, the coaches were more inclined to let athletes compete who they thought had the mental capability to stay calm, confident and focused during a competition than athletes who they thought would be nervous and not mentally ready to compete with an injury. The coaches who differentiated in their decisions on the basis of the athletes' self-esteem, tended to choose what would be best for the athlete's feelings. In one case this would be competing, in another case this would be staying out of the competition. In addition to psychological characteristics, physical characteristics were sometimes used to distinguish between athletes. Some coaches said that their decision might be different depending on the athlete's body build or speed of healing. Box 4.2.7 provides some examples of quotes regarding athletes' personal characteristics.

The athlete's experience

A number of coaches noted that their decision would be influenced by the type of experience that they thought the athlete would have if she competed. If they thought she might have a negative experience, competing would be less likely. If they thought she might have a positive or useful experience, competing would be more likely. Several different types of experiences came up in this regard, most of them in conjunction with a higher likelihood of competing. Some coaches might consider

ATHLETE's PERSONAL CHARACTERISTICS

Keenness, motivation

* If I feel that the athlete knows that she is not going to be in the top ten. And she is not going to push herself anyways, but ...[..] If she is just very laid back, then I would let her. But if I feel that she is just really hyper and go go go, then I would say no. So...

* Some kids don't even come into the gym when they are injured and some do, so it is those kids that you know are determined, and you want to thank them for that and you can let them compete, whereas some kids come into the gym and say "I am healed, let's compete"; you say 'sorry'. The kid who is in here working is the kid that is going to compete.

* It depends on the kid. You have some 15 year olds that will hum and ha, and I'll say to them: "Well, if that's how you feel, stay home". Whereas the next one will be keen, works really hard and "I am going to give it my best; it hurts a little bit, but it won't matter, I can do it". Then they are a chance

* It makes a big difference. If she is really shy and quiet but yet strong willed, the chances of her competing... you know that if she says yes I can, it probably means that she can, because she is not going to talk unless she means it. But, yes, personal characteristics to me are really important. You can tell when somebody... even if they sprained their ankle and it was quite severe... three weeks later, your ankle can heal quite a bit, if you take care of it really well. And you can tell if the kid does not want to compete. She would say something like "My ankle feels the same as it did two weeks ago". That is a pretty good indication that they don't really want to compete.

* Because personality is a big part of it. Some people say they want to compete, and to understand the reason why they want to compete. Sometimes their rationale behind wanting to compete is the wrong reason. [..] it comes down to reasons that they want to compete. Personality things such as showing off, they really want to do it for themselves. Possibly the pressure from the parents.. You can tell if there is pressure from outside the gym. Whether it is from peers or from parents. That is a definite... what I believe is negative in a way [..] because it is not internal, because it is not for the goal of themselves, they are thinking about others. That kind of pressure is kind of unhealthy, I believe. [..] it is the wrong reason to compete. The reason should not come from external pressures. I believe it should come from an internal decision to compete. You want to compete, and that the person... it will directly affect their confidence level too. The more it comes from within themselves, the more confident they'll be.

Pain tolerance, mental toughness

* There is different kinds of kids who react differently to injury. I have 2 kids that I can think of who are on the opposite ends of the spectrum. One, she can be hurt, a little bit, and she can get mad and it drives her to do better, through the pain. Another kid, the pain can be so minor that you can't even believe that it actually hurt, and she can't even do a cartwheel. For one of those 2 kids, yes I would probably let her compete, because I know that going against adversity highly stimulates her mind and she can compete well under pain, with pain. The other, not a chance. She'd probably kill herself.

* Some kids are whiners, and other kids hide pain and should not be there.

* Whether the gymnast usually pretends that she is okay, or pretends that she really is not okay; you know, there are a lot that say that they are hurt when they are not. It all really depends on the personality of the gymnast, too, because a lot of them..., if they are hurt, they don't say anything at all. And others ... if it hurts the slightest bit, they will blow it out of proportion. So, you have to know the gymnast. If a gymnast is hurt and she doesn't say anything, you have to know how to understand them. So it is hard, if you don't know what gymnast you are talking about.

* It would be her, her attitude, how she could train, what she was willing to push herself through. Sometimes with pain tolerance you never really know. And if she could push herself through a little bit, then... you know, sometimes it is not as bad as you might think or... and how willing she is to take care of it and do the necessary things... if she is training on it that she is icing it and doing the physio and doing all that kind of stuff afterwards.

Box 4.2.7a. Selected quotes regarding personal characteristics of athletes that would make a difference.

ATHLETE's PERSONAL CHARACTERISTICS

Mental state during performance

* ... and depending on their history with injury, that would also be an important factor. Because knowing if the athlete has competed with an injury before.. you kind of know how that will affect them, and I think that is pretty important too.

* And also, their personalities relating to how they feel about their own moves. If that athlete is nervous about these moves, then, already, you are better off not to place her into that situation. If an athlete is very very confident, in her own ability, in her moves, if she can handle the pain that she might feel on impact, then your decision might be based more on that.

* it really would depend on the athlete, how I knew the athlete, depending on their mental skills. If they do have their head together and can concentrate a lot. [..] The average one would have less... I would not trust that athlete as much to pull it off.

* I have had some athletes that are pretty calm. They go into competition, they concentrate when they are in competition. They compete how they have trained. And I have other athletes who do beautiful front handsprings, do nice good full turn dismounts, and then when they get to a competition, you think "Who is this person?" Because they .. run into the vault.. and so, I think that is where I am making the decision on the athlete, based on her past. If it is the athlete who is not very stable competitor, I would definitely say no, and I would tell them why.

* Fear is another part of the personality. How well the handle... for example, beam, typically, for most girls, beam is their biggest fear. An injury can also directly affect that fear. If they have an injury, that may be an extra thought in their mind on the beam "I wonder if my ankle is going to give in" and that will negatively influence their performance, and that will definitely affect my decision as to whether or not to let them go.

Self-esteem

* It just depends so much on the actual individual, like whether she needs it psychologically, or whether she is strong enough and confident enough to be able to miss a meet without having detrimental personal consequences. It really depends so much on the individual athlete.

* ... how important this particular activity is to them, as a person at this point in their life. I have to weigh the possible negative long range effects of the no versus the physical protection that has to be there. With some athletes you can look and you know that it is going to make no difference; their self-esteem will stay intact, their self-image will stay intact. They will still be positive, they will still approach the sport in a positive manner. If all those factors come out negative then I look at it a little differently. So I try to weigh one versus the other. Plus I have to weigh what are the effects of this athlete performing well below her own expectations or her own potential, what effect will that have? And if it does not have a negative effect, we'll put all the variables together.

* ... because in a lot of cases it would depend on the kid, not just the injury, but also their psychological make-up... how they compete with an injury. Some kids... if they do have an injury it probably means they will perhaps have to water down their routines and not do some of their harder skills. And some kids don't mind doing that, and there are other kids that would feel inferior if they had to water down their routines. And if they really felt badly about doing watered down routines, then they probably, more than likely would not compete.

Physical factors

* ... depending on the athlete. Some athletes heal faster than others, [..] each sprain is different, they are not all going to heal at the same time, and if we have done a lot of conditioning and a lot of bar work, while she was not able to walk and stuff.

* Each individual is different, some are stronger than others

Box 4.2.7b. Selected quotes regarding personal characteristics of athletes that would make a difference.

competing the athlete if they thought she needed exposure to the competitive environment, or to the judges. The meet was seen as an opportunity to provide a useful learning experience for the athlete's development as a competitor. A few coaches emphasized what competing with an injury might teach the athlete at a personal level, for example, competing with a moderate injury might teach the athlete how much she could and could not take, and how well she could handle added stress. One coach commented that, provided she would not hurt herself more, it would be a good opportunity to experience a competition with the attitude: "I am not going to do great, but I am going to do my best", which might then be carried over into the next competition where she could compete really well. The opposite decision, not to compete, might also be accompanied by the argument of providing a personal learning experience, as was found during the pilot work for this study when one of the coaches stated that it would be a good opportunity for the athlete to learn the value of waiting and of being prepared for the next time.

Another type of experience that was taken into consideration was related to the athlete's feelings in terms of a sense of personal achievement or failure. Coaches would consider competing if they thought the athlete might feel like a failure if she did not at least try to compete. Some coaches did not explicitly say that the athlete's sense of achievement was a consideration, but left it implicit by stating for example "*This competition might have been her goal for the year*", or "*She has worked hard*". Coaches would not consider competing if they thought the athlete might have a negative experience that would undermine her self-confidence, sense of pride, or motivation to stay in gymnastics.

Having fun and enjoying social contacts was another experience mentioned as a consideration. This aspect was usually associated with an increased likelihood of competing, particularly if the coach was concerned that the athlete might feel left out, socially, if she did not take part in the meet.

In some cases it was recognized that the athlete's experience might be something to be considered, but it should not affect one's decision. For example: "*Why have a girl be happy for one day and losing a year of training?*" "*She can be just as much use and have just as much fun coming to the meet and being with the girls and helping training and helping warm-ups than she could be risking injury for nothing*". Examples of considerations regarding the athlete's experience are presented in Box 4.2.8.

Doctor's recommendations

A number of coaches indicated explicitly that they would take into consideration what the doctor had recommended. For some, the doctor's advice seemed to be a major contributing factor to their decision. If they perceived the doctor's advice to be positive (e.g. "*The doctor said 3 weeks, it has been 3 weeks*"), the likelihood of competing would definitely be higher; if they perceived it to be negative (e.g. "*If the doctor said there was a high risk of reinjury*") the likelihood of competing would definitely

THE ATHLETE's EXPERIENCE

Learning experience

* Just that she knows what a competition is, and she can see, be there to watch the other girls at the competition, just to be around that environment.

* She would have to know that she would not make the team, and that she would just be doing her beam and bar routine to see what her scores are like and to see how she could possibly improve for next year.

* and just use the meet to stay in shape, and just to see where the other children are at.

* So if I still feel that she could compete in that competition, she has got the okay from physio, she is going to compete in this competition even though she is not going to finish in the top 8 to 10, and mentally I know that that is not going to be a total negative experience for her - obviously she won't like it if she does not do well, but that she can learn from it and it is not going to be a negative mental experience for her, I would let her do it.

* Probably... well if the doctor gave her permission, and if I felt that it was good for her development in competition, and it was not likely to put further injury on her if she would do her watered down routines, then I would probably say ... two or three. Two.

* I would say about a 7. It is just a moderate injury... The way that we treat moderate injuries is... they can be very... it is bad to say 'helpful', but they teach the athlete, and they tell the athlete how much they can take and how much they can't take. If it is just a moderate injury, there is going to be some pain and to add to that stress... and personally I don't think it is going to hurt them if they try it. Plus, because it is an invitational we can water down their routines and they just can get through the meet and see how they did under a lot of stress.

* If they are willing to accept not being in the top, and accept that they have an injury and whatever... I don't push them to overcome it... To be there for gymnastics. I think that would be a really good way to go into a competition, almost, in a way, because of the fact that you sort of have a scapegoat, you can experience the competition without being totally worried. Like kind of knowing that.."I am not going to do great, but I am just going to do my best." And I think that would be a really good way to experience a competition, to a degree... provided that they are not putting their bodies in jeopardy. Because hopefully at the next competition, when they can perform really well, they can go in with the same sort of attitude, like "I am going to do my best", and that sort of thing. So.... I don't know, I think there can be a lot learned from competing with an injury.

Fun and social contact

* I would consider her just doing one or two events, just for the fact that it was an away meet and she was really pumped up on going, and I think it would be a real let down for her not to be able to go if all of the other girls got to go.

* I would probably give her a 6. Let her go, see how her foot feels, like in warm up or whatever. It will be fun, she is close to the end, and if she feels like.. because she is just there for fun or whatever..

* Let her go... and even though you know that they are not going to do really great, it might even be just the experience. Like it might even be the last time they get to go to this kind of a meet. And even the experience of going out of town and being with other kids is a lot of fun, even...

* going away and having fun.. that is also important, not just how well you are going to do at a meet, especially at that age, because their days, their years are numbered. Fifteen year olds don't stick around.

* she may want to go just because ... do maybe only a bar routine.. just to go to be with the other girls for the sport.

Box 4.2.8a. Selected quotes regarding the athlete's experience in terms of what she can learn, and in terms of fun and social contact.

THE ATHLETE's EXPERIENCE

Sense of personal achievement

* And if they were 8 years old, that would mean that they were probably just competing for the first time or maybe their second, and you want them to have a positive experience competing, so that hopefully they could build from that and not a negative experience, which could happen if they were injured.

* And it would have crushed her more, psychologically, if she did not try than if she did try and not make it, fine, than if I had not let her try [..] I thought she had a really good shot at it, and if she did not try out she would have been much more upset than if she tried hard and she was in pain.

* That one because if she is of average ability, then that is probably one of the competitions that she will do her best at. Because the level of competition is not as high. So it would be a positive experience for her.

* Because it might have been her one goal for the year, to compete at that meet. That would be worse, if she did not compete at it.

* More likely. Because if she really wanted to do something that she had learned in a competition, but she was planning on quitting, she would feel... she might feel like a failure, without doing what she set out as a goal. It is a long road to train until the next competition.

* You could say: there is a good chance of her competing, but not all around, because of the invitational meet. It is not important that we do compete all around, but at the same time, the motivation for going to this meet, in rewarding of her hard work is there, so...

* Okay,.. it is a qualifier for Westerns... moderate injury... I would say it is going to be fairly high, with a 15 year old, especially a good 15 year old, they have spent most of their year toward a certain level of meet; and to miss the qualifier to go to that meet is pretty devastating with an older girl.

* If she was going to place in the top 8, and if she was in her best performance, and with the injury.. it could be really discouraging to her as well. If she did not do how she could have if she was not injured. I just think it would bring up a lot of other sort of mental pain.

* They are never simple, these decisions. Even the ones where I said zero are never simple, because there are other factors that you have to discuss with the child. Because there is going to be a psychological impact, and you have to deal with that, because that could have an effect on how they view the sport in the future, or how they train for the next 6 or 7 months or whatever.

* At that age, already, average ability... so, one build-in factor is that they don't have a lot of experience in competitions. And I find, what is very important with athletes like that, is you don't put them in a meet if they are not going to end up with ribbons, or at least do well and feel good about themselves. So, there you have to look at the possibility of... because of the injury, if she feels maybe slightly intimidated because of it, and does not do well, how is it going to affect her psychologically after the meet. You know, ready to quit.. 'I don't want to do this, I'm not good at it.', that type of attitude.

* Zero. It is not worth it; it is not worth it for her to compete. Just let it heal and try again another time; why going to a competition and not do well, and maybe ruin her confidence, whereas if you could wait she might be fine the next time. So.., that's how I would do it.

* Probably a 2, I would not likely pick her to compete at all. Because, if she was not likely to place high, and if she is injured, she will not do as well as she usually is expected to, and it will probably be damaging both mentally and physically,

Box 4.2.8b. Selected quotes regarding the athlete's experience in terms of preserving a sense of personal achievement.

be lower. For others, the doctor's advice would act more or less as a 'filter'. If the doctor said competing was risky, then they would definitely not compete the athlete; if the doctor said the athlete would probably be okay, then the coach would take other factors into consideration, for example, "*How is the athlete performing her routines*"?, "*Is it still worthwhile for her to compete with watered down routines?*".

Parents

The desires of the parents with regard to their daughter's participation were sometimes mentioned as a consideration. A few coaches indicated that they would be more inclined to let the athlete compete if the parents wanted her to give it a try. It seemed that in some cases, the coaches might use the parents' desire to see their daughter compete as a way of relieving part (or all) of the responsibility for the consequences of the decision. "*I would hope her parents would say no, but if they are going to say yes, then I would let her go. It is the parents' kid, not mine*", "*If the parents really feel 'let her try', then I would let her try. I do a lot of talking with the parents, it is their kid, not mine*", "*But if she is definite and her parents..., then of course I'll give her the opportunity*", "*I don't say no if the parents take the responsibility, but if it was up to me I would not let her compete*".

In other cases, the coach might just feel plain helpless and be afraid to stand up and go against the parents' wishes. "*You can't say no if she is going to insist and her parents are going to blow up at you or whatever*" "*A lot depends on the parents; if they want their child to compete, then they might get mad at you if you tell them you are not going to let their daughter compete*".

Trust in the athlete's story

An issue mentioned a couple of times in the coaches' considerations was whether or not they could believe the athlete when she said that she was 'fine'. Several coaches said that an athlete might say that she was not hurting, but that they could see from the way she was moving, limping or favouring other body parts, or even from her face, that this was not true. Only one coach claimed that she could not see this, unless she knew the athlete well. A few other coaches indicated that they had an open relationship with their athletes and they felt that they could trust what the athlete was relating about her injury, especially if the athlete was older.

Some coaches also commented that the opposite situation, an athlete who constantly claimed she was hurt without anything really seriously seeming to be wrong, presented a problem for them, because it would be really hard to draw the line.

Competitive level

Several coaches pointed out that the competitive level of the athletes that they were coaching was a factor in their decision. For Class I and II, and sometimes Class III athletes, the fun and social component of the sport was said to be more important than the competitive component. It was also said that these athletes were working closer to their optimal level, so that it would be harder to water down their routines without having too little difficulty in them. At the same time, it was noted that at this level the athletes who performed the cleanest routines would be the ones that won. As was the case with several other factors (e.g. age, injury symptoms) the low level of competition was used as an argument both against and in favour of competing. Some coaches said that competing would be unlikely because competitions were not really important at this low level; other coaches commented that the skills were so simple at this level that there was not much risk in performing them with an injury. A few coaches remarked that their decisions might be different if they were dealing with international level athletes.

From Class III and IV up, competing was considered more important and missing training more detrimental. "*The higher the level that they are competing at, the more important it is that they compete. Just because.. if they miss certain competitions, they won't be able to compete at their most important meet, usually, and they won't be ready.*" An argument that came up in association with higher level athletes was that the skills at that level were so risky that trying to execute them with an injury would be hazardous. On the other hand, it was also argued that higher level athletes tend to be very conditioned and will recuperate faster from an injury. It would also be easier to change their routines because they have more skills to choose from than a lower level athlete. One coach commented that higher level athletes are very determined and tend to be high achievers, therefore they would probably want to compete themselves. Another coach suggested that the higher the competitive level, the more injuries the athletes were going to work with in the gym already. For this coach, the performance level of the athlete when working with the injury seemed to be the main criterion: "*You just have to decide whether the injury is severe enough to severely affect their performance or not; if you are only working say at 70%... I take the risk..* ". One coach insinuated that the amount of time and effort 'put into an athlete', might be a factor in the decision with an elite level athlete. "*But if they were going towards Nationals I would compete them because of the peaking and the time efforts put into them*".

The comments about the effect of the athlete's competitive level on one's decision making suggest that a decision to let an injured athlete compete is not necessarily made more readily at a higher level, but rather that the considerations that come into play may be different. One coach noted for example: "*A long time ago I always used to.. the higher the level, the more I was flexible. Now, I am the other way around. The higher the level, the less I am flexible. I am only going to give them a shot at doing well. Missing one or two competitions is not going to hurt them. It took me a lot of years to realize that.*"

Rules

A few coaches noted that they would apply certain rules, club rules or their own rules, to this situation, for example, a club rule that said that the athlete had to be able to show respectable routines one week before the meet in order to participate, or a club guideline stating that if the athlete is favouring any type of injury, she should not compete. One coach told that she would set certain things that injured athletes had to be able to do before she would allow them to compete.

Questions

The coaches had a chance to ask questions if they wanted any further information after the scenarios were read to them (the information that was or would be provided on request is listed in appendix C). Not many coaches made use of this opportunity. Only 16 coaches (25%) asked a clarifying question after the first scenario, 11 of whom also asked a question after the second scenario. Seven coaches asked a clarifying question after the second scenario only. Of the 11 coaches who asked questions after both scenarios, 7 asked a similar question, 4 asked 2 different questions. Sometimes the questions concerned requests for new information, not provided in the scenarios (for example: "*Do we know how severe the sprain is? "What did the doctor say?" "When in the season is this meet?*"). Other times the questions were just verifications of what was explicated in the scenarios; for example "*She only worked two events? She has not worked anything else?*" "*She insists that she is able to do it?*". Most of the clarifying questions that were asked after the first two scenarios (14 out of 34) were inquiries after the doctor's opinion of the injury or the situation. The other questions asked were alternately related to how much training the athlete had been able to do, the severity of the injury, the timing within the competitive season, petitionability of the meet and the athlete's attitude.

Three quarters of the coaches, however, did not ask any clarifying questions. They generally just took the information that was given to them, and based their decision on these premises, although sometimes they would add some assumptions of their own.

Summary of Part II

The responses to the scenarios contained references to various components of the decision making process. The coaches mentioned alternatives to competing, and modifications to the manner in which the athlete would be competing if they decided to allow her to compete. They also talked about strategies that they might use to manage the decision process, in particular obtaining information, sharing the responsibility for the decision, talking with the athlete and/or her parents, and delaying the decision or choosing to make it early. The responses further included a great number of considerations, generally in the form of arguments supporting the decision either in the direction of competing or in the direction of not competing. Some 14 different factors were brought up in the considerations in various forms. Five of these factors - injury, age, ability, meet, and the athlete's willingness to compete - had been included in the description of the scenarios, so it is not surprising that the coaches involved these factors in their considerations. However, they also spontaneously talked about a number of other factors, such as personal characteristics that would differentially affect their decision for different types of athletes, the performance level of the athlete, the kind of experience that the athlete would have if she did compete, or if she did not compete, the perceived risks involved in competing, the doctor's recommendations and the wishes of the parents. It was interesting that sometimes one and the same aspect of a factor, for example the athlete being 8 years of age, was used in totally opposite ways by different coaches, some using it in arguments to support a decision towards competing, others using it in arguments supporting a decision against competing.

PART III: Decision policies

Introduction

This section focuses on the decision policies of the coaches, calculated on the basis of their numerical responses to the scenarios and represented in the form of a mathematical model. The analysis of the scenario data was directed at (a) describing the general decision policy of the coaches in this study (i.e. the effect of each parameter and combination of parameters on the likelihood of competing for the total group of coaches), (b) looking for sub-groups of coaches on the basis of similarities in individual decision policies, and (c) comparing the general decision policies of coaches at different competitive levels.

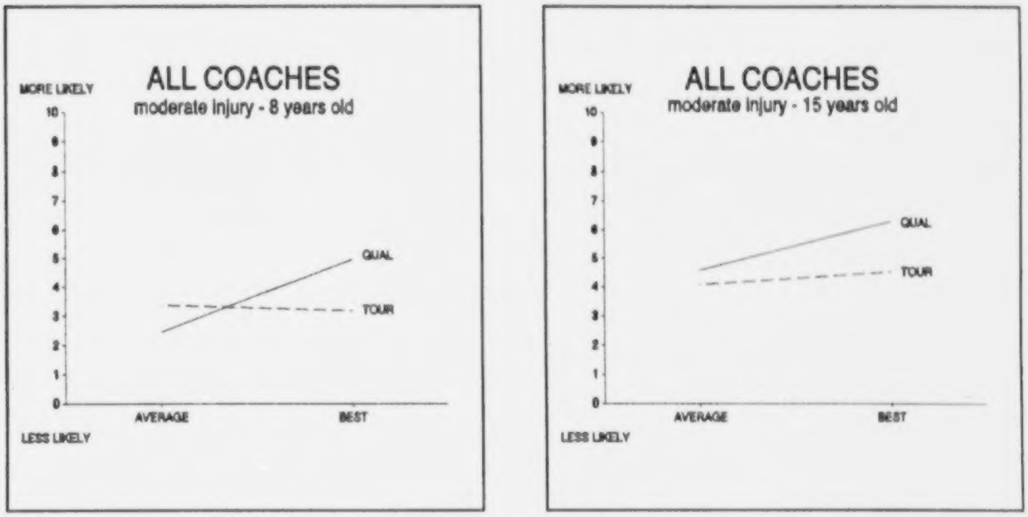
The analyses were carried out according to a procedure described by Louviere (1988), called 'Metric Conjoint Analysis'. This version of the conjoint approach employs a multi-linear polynomial mathematical function to model decision makers' policies, and uses analysis of variance (ANOVA) or multiple regression analysis with effect coding to determine the appropriate form of this function. Ideally, in conjoint analysis, determination of the policy model takes place at the level of the individual decision maker. At this level, the form of the model can be estimated with only one evaluation per combination of parameter levels. However, in order to statistically test the form of the model, all combinations of parameter levels need to be evaluated more than once, because with only one evaluation per combination the model is saturated, leaving no degrees of freedom for error and testing. Since it was not possible to test the policy models at the individual level in this study, as no more than one evaluation of each combination of parameter levels was obtained, an aggregate model was calculated instead, by conducting an ANOVA on the data of the whole group. This analysis provided the information regarding point (a). To address point (c), competitive level was included as an extra factor in the ANOVA. The information regarding point (b) was sought by calculating multiple regression analyses with effect coding at the individual level, followed by a K-means cluster analysis.

Overall decision policies

A repeated measures within-subjects ANOVA was carried out on the four parameters varied in the scenarios to determine the form of the overall decision policy of the coaches (Table 4.3.1). The four significant main effects in this analysis indicated that overall, the coaches were more likely to allow the athlete to participate in the competition if the injury was less serious (moderate rather than severe), the athlete older (15 instead of 8) and better (best vs. average), and the meet more important (qualifying vs. tournament). However, the fact that a significant four-way interaction was found suggests that the relationship between these four parameters was a complicated one, with each combination of parameter levels having a unique influence on the coaches' decisions. As there are multiple ways to break down a four-way interaction in order to take a closer look at its components, pursuing all the options for presenting the results would be a lengthy, tedious and somewhat redundant procedure. Therefore, one perspective was chosen. The interaction was first broken down according to the levels of injury, and, subsequently, the levels of age and ability. Injury was chosen first because the main effect for injury was the most pronounced. To support the breakdown of the interaction, the lower level interactions were partitioned out and tested for their significance, using contrast matrices for post-hoc comparisons. A graphic representation of the breakdown and the accompanying levels of significance is presented in Figure 4.3.1.

The four-way interaction

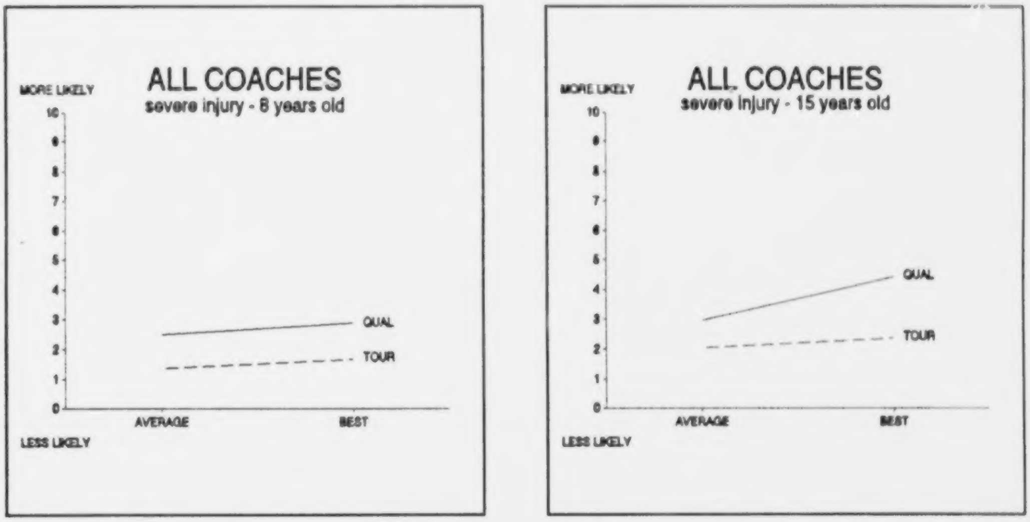
The follow-up ANOVA's showed significant three-way interactions between age, ability and meet, for both the moderate and the severe injury. The two-way interactions between ability and meet were significant for three of the four combinations of injury with age; only for an 8 year old athlete with a severe injury the interaction between ability and meet was not significant. The main effect of meet was significant for most combinations of injury, age and ability, except for average 15 year old athletes with a moderate injury.



a) p = .015

b) p = .000 c) average: p = .012
best: p = .000

b) p = .001 c) average: p = .148
best: p = .000



a) p = .013

b) p = .838

b) p = .000 c) average: p = .000
best: p = .000

Figure 4.3.1. Four-way interaction broken down according to injury and age. The p-values indicate the degree of significance at the level of a) three-way interaction age*ability*meet, b) two-way interactions and c) main effect for meet.

Table 4.3.1. **Repeated measures within factor ANOVA on the scenario data.**

SOURCE	SS	DF	MS	F	P
INJURY	653.441	1	653.441	50.446	0.000 ***
error	816.059	63	12.953		
AGE	297.563	1	297.563	60.631	0.000 ***
error	309.188	63	4.908		
ABILITY	183.941	1	183.941	48.374	0.000 ***
error	239.559	63	3.803		
MEET	268.141	1	268.141	32.262	0.000 ***
error	523.609	63	8.311		
INJ*AGE	17.535	1	17.535	8.468	0.005 **
error	130.465	63	2.071		
INJ*AB	15.016	1	15.016	9.163	0.004 **
error	103.234	63	1.639		
INJ*MEET	17.535	1	17.535	4.752	0.033 *
error	232.465	63	3.690		
AGE*AB	3.285	1	3.285	1.789	0.186
error	115.715	63	1.837		
AGE*MEET	16.000	1	16.000	9.956	0.002 **
error	101.250	63	1.607		
AB*MEET	103.785	1	103.785	30.452	0.000 ***
error	214.715	63	3.408		
INJ*AGE*AB	6.250	1	6.250	4.578	0.036 *
error	86.000	63	1.365		
INJ*AGE*MEET	2.441	1	2.441	1.610	0.209
error	95.559	63	1.517		
INJ*AB*MEET	28.891	1	28.891	12.394	0.001 **
error	146.859	63	2.331		
AGE*AB*MEET	0.473	1	0.473	0.338	0.563
error	88.027	63	1.397		
INJ*AGE*AB*MEET	23.766	1	23.766	9.819	0.003 **
error	152.484	63	2.420		

The two-way interactions were of the following nature. (1) In the situation of a moderate injury and an 8 year old athlete, the significant two-way interaction between ability and meet indicated that if the athlete was of average ability, coaches would be more inclined to let her compete in a tournament than in a qualifying competition, whereas if she was one of their best athletes, the reverse would be true: it would be much more likely that she would compete in a qualifying meet than in a tournament. (2) The combination of a moderate injury and a 15 year old athlete also yielded a significant two-way interaction between ability and meet. For an average athlete the likelihood of competing would be the same, regardless of the importance of the meet. For a best athlete, the likelihood of competing was significantly higher if the meet concerned a qualifying competition than if it concerned an invitational tournament. (3) In the case of a severe injury and an 8 year old athlete, the two-way interaction between ability and meet was not significant. For both the average and the best athlete, competing would be more likely in a qualifying competition than in an invitational meet. (4) The two-way interaction between ability and meet was again significant in the situation in which the injury was severe and the athlete 15 years old. For athletes of both ability levels competing was significantly more likely if the meet was a qualifying competition than if it was an invitational tournament, but for a best athlete the likelihood of competing in a qualifying meet was significantly higher than for an average athlete.

The main effect for meet suggested that the type of meet made a difference in coaches' decision making, except in the case of a 15 year old athlete of average ability with a moderate injury. For this type of athlete, competing in a qualifying meet or a tournament was equally likely. In all other cases, except for one, the likelihood of competing was higher for an important qualifying competition than for an invitational tournament. The only case in which the reverse was true was the case of an 8 year old athlete of average ability with a moderate injury. For her, competing was more likely in a tournament than in a qualifying meet.

Comments

It is interesting to note that in the case of the 8 year old athlete with a moderate injury, the ability level of the athlete seemed to have a reverse effect, in comparison to all other injury-age combinations; an average 8 year old with a moderate injury was less likely to compete in a qualifying meet than in a tournament, whereas for all other combinations competing in a qualifying meet was at least as likely and generally more likely. Although it is possible that coaches are indeed more inclined to let an average 8 year old athlete with a moderate injury take part in a tournament than in a qualifying meet (e.g. because there is less stress at an invitational tournament), it is also possible that this result is due to an order effect, because the M8AQ scenario was the first scenario presented to the coaches. The coaches may have responded with a lower score than they did later in the interview. Why this is the case is hard to say. The fact that this scenario contained a more detailed description of the symptoms of the injury, may be responsible; on the other hand, the second scenario also contained a detailed description, be it of the severe injury, and this scenario (Sv8BQ) was not ranked lower than its tournament counterpart.

Although definite trends could be detected for parameter combinations that would influence the coaches' decisions towards more or less likely, for most scenarios the average score was at the lower end of the scale (i.e. below 5). The only situation where the average score reached the top half of the scale (6.03) was in the case of a best athlete, 15 years old and with a moderate injury, wanting to compete in an important qualifying meet.

Inter-individual differences in decision policy

In order to answer the question if the coaches could be differentiated on the basis of their decision policies, individual decision policies were calculated first. By subjecting the scenario data of each coach to a separate multiple regression analysis with effect coding, individual decision policies were estimated, each in the form of a polynomial multi-linear model, which included the following terms:

$$D = C + X_1 I + X_2 A + X_3 B + X_4 M + X_5 IA + X_6 IB + X_7 IM + X_8 AB + X_9 AM + X_{11} IAB + X_{12} IAM + X_{13} IBM + X_{14} ABM + X_{15} IABM$$

in which D was the decision made in terms of a likelihood indication on a scale of 0-10, *C* was a constant, *I* referred to the severity of the injury, *A* to the age of the athlete, *B* to the ability level of the athlete, *M* to the importance of the competition, and *X* to regression weights, representing the

Table 4.3.2. **Regression Coefficients for Cluster I and Cluster II**

	CLUSTER I n=32				CLUSTER II n=30			
Variable	**min.**	**mean**	**max.**	**S.D.**	**min.**	**mean**	**max.**	**S.D.**
constant ***	0.06	1.80	3.50	0.94	3.56	5.01	7.50	1.07
injury ***	-2.44	-0.49	0.19	0.61	-3.56	-1.19	0.06	1.00
age	-0.31	0.62	2.13	0.54	-0.25	0.49	2.00	0.55
ability	-0.25	0.40	1.38	0.42	-0.56	0.47	1.88	0.55
meet	-0.38	0.56	2.44	0.62	-1.63	0.50	2.13	0.81
inj*age	-1.13	-0.16	0.38	0.33	-1.44	-0.11	0.69	0.39
inj*ab	-0.94	-0.12	0.50	0.36	-0.88	-0.13	0.56	0.28
inj*meet ***	-0.69	-0.04	1.25	0.36	-0.88	0.32	1.94	0.53
age*ab	-0.69	0.06	0.75	0.35	-0.63	0.06	0.88	0.33
age*meet	-0.25	0.16	1.06	0.26	-0.63	0.09	0.88	0.37
ab*meet	-0.25	0.30	1.81	0.43	-0.88	0.36	1.69	0.49
inj*age*ab	-0.44	0.03	0.44	0.23	-0.50	0.14	1.06	0.34
inj*age*meet	-0.50	-0.00	0.63	0.27	-1.06	-0.10	0.50	0.34
inj*ab*meet	-1.19	-0.12	0.75	0.35	-1.50	-0.23	0.31	0.41
age*ab*meet	-1.00	-0.01	0.38	0.31	-0.69	-0.04	0.44	0.28
in*ag*ab*me	-0.31	0.08	0.88	0.30	-0.38	0.24	1.81	0.45

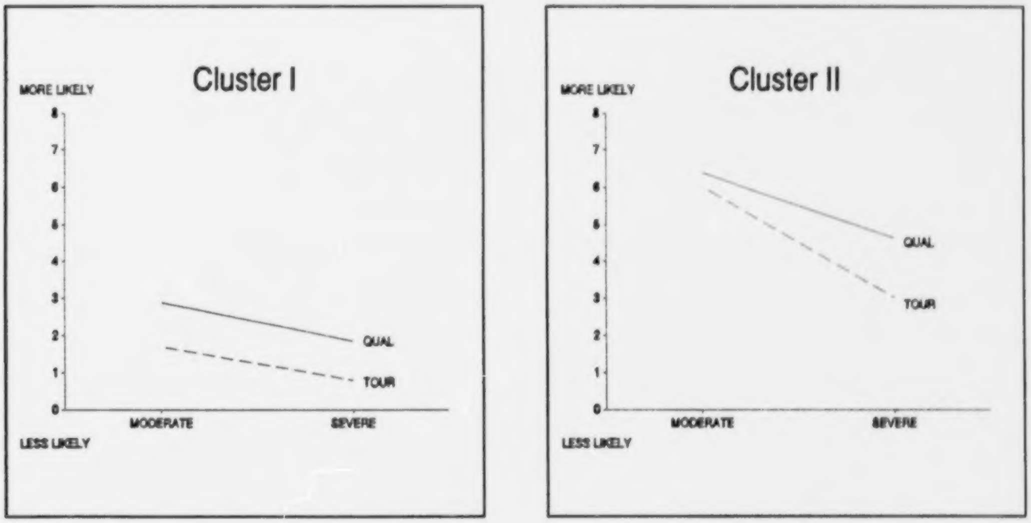
***** significant differences between cluster I and cluster II, p < .001**

importance attached to each parameter and combination of parameters.

Two coaches assigned the same rating to all 16 scenarios, thereby indicating that they made no difference in the evaluation of the four parameters. One coach assigned all zeros, indicating that under no condition the athlete would participate, the other all sevens, indicating that the athlete would likely participate in all of the scenarios. Because of this lack of variance, no regression weights could be calculated. These coaches were therefore eliminated from the next step in which the regression weights were used in a K-means Cluster Analysis to see if the coaches could be grouped on the basis of their policies. Two clusters, almost equal in size (32 and 30 coaches respectively), emerged from this analysis (see Table 4.3.2).

The two clusters differed significantly on the following three factors: constant, injury and injury*meet interaction. The mean constant for cluster I was 1.80, for cluster II 5.01, indicating that overall, coaches in cluster II were more likely to let an injured athlete compete than the coaches in cluster I. Furthermore, the coaches in cluster II tended to weigh the factor injury as well as the interaction between injury and meet more in their decision policy (-.49 vs. -1.19 for injury and -.04 vs. .32 for injury*meet interaction respectively).

Follow-up ANOVA's were conducted to determine the significance of the injury*meet interaction within each cluster (see Figure 4.3.2 for a graphic representation of these interactions). The



p = 0.572

p = 0.003

Figure 4.3.2. **The differences between cluster I and cluster II in injury*meet interaction.**

injury*meet interaction was not significant for cluster I (F (1, 31) = .326, p = .572). For both levels of injury, competing was considered more likely in a qualifying meet than in a tournament. For cluster II, the injury*meet interaction was significant (F (1, 29) = 10.6, p < .01). Further post hoc comparisons indicated that there was no significant difference between the two types of meet if the injury was moderate (F (1, 29) = 1.019, p = .321). However, if the injury was severe, competing was more likely for a qualifying meet (F (1, 29) = 20.079, p < .001). For both clusters, the likelihood of competing decreased from a moderate injury to a severe injury, however, the extent of the decrease was greater for cluster II than for cluster I.

Recapitulating, the major difference between the two groups of policies was the level of the intercept (constant) and the weights assigned to the severity of the injury and the interaction between the levels of injury and meet. For the coaches in cluster I, competing with a moderate injury was unlikely, and with a severe injury even more unlikely. For the coaches in cluster II, competing with a moderate injury was likely, regardless of the type of competition; when the injury became more severe, competing became less likely, but it would definitely be considered more for a qualifying meet than for a tournament.

In order to examine the treatment of the parameters within the two clusters, separate repeated-measures within-factor ANOVA's were carried out for each cluster. All 4 main effects and 3 of the 8 interactions that were significant for the whole group were also significant for cluster I: injury*age (p < .011), age*meet (p <.001) and ability*meet (p <.001). For cluster II, the 4 main effects were also significant, as well as 6 of the interaction effects, one of which was the four-way interaction injury*

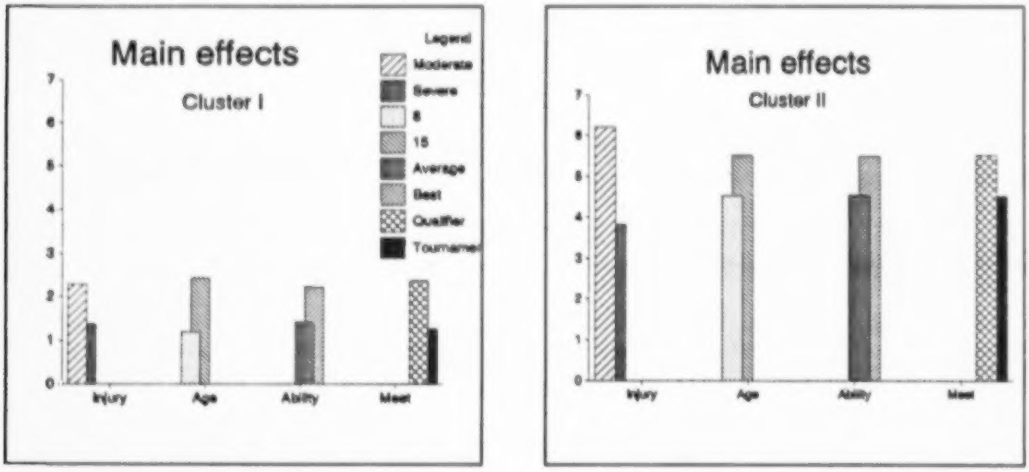
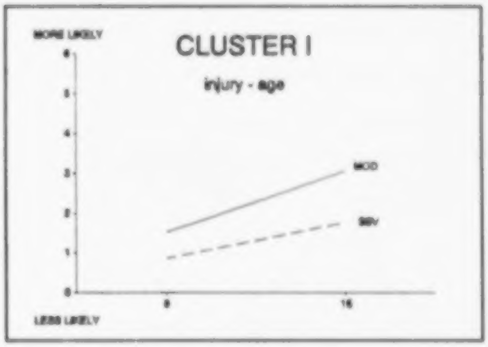
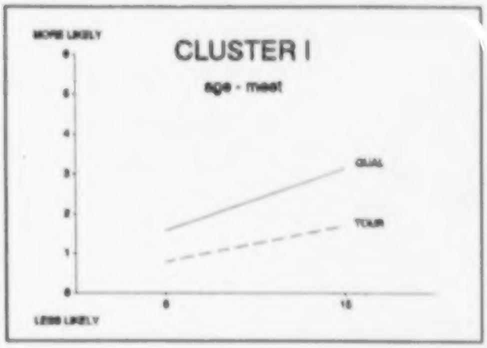


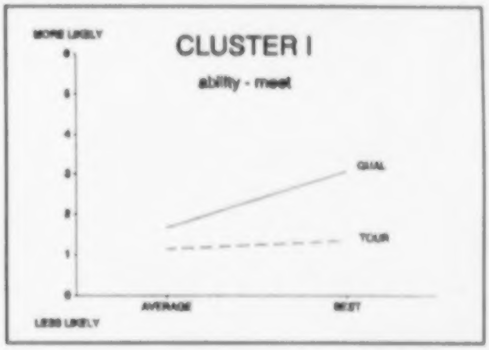
__Figure 4.3.3.__ **Means per parameter level for both clusters.**



p = .013 p = .000



p = .001 p = .000

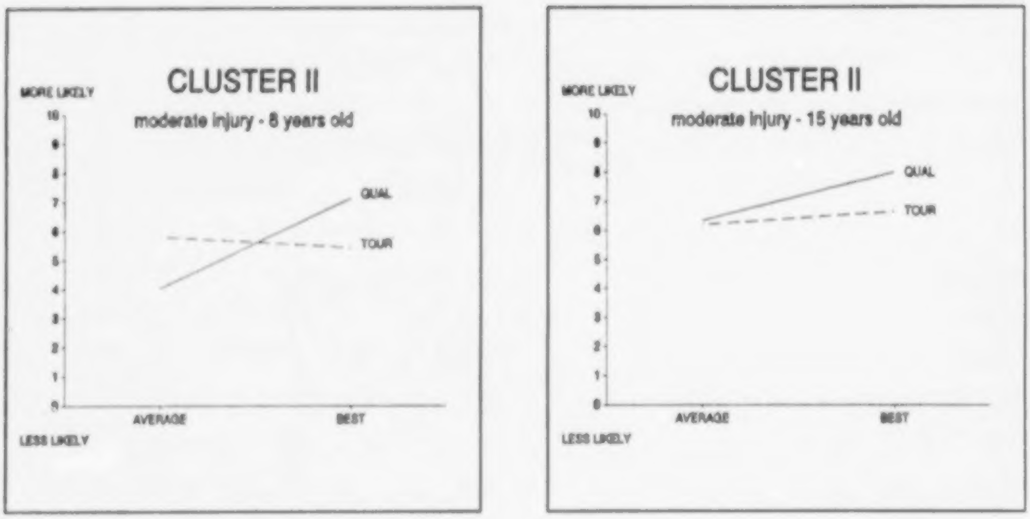


p = .001 p = .000

Figure 4.3.4.
Significant two-way interactions within the policies for cluster I.

*age*ability*meet (p < .01). That more of the effects were significant for cluster II than for cluster I, in particular the four-way interaction, suggests that the decision policies of the coaches in cluster II were more complicated, determined by each unique combination of parameter levels, whereas the decision policies of the coaches in cluster I were less complicated, weighing the parameters more independently of the levels of the other parameters. Comparing the main effects between the two clusters (Figure 4.3.3), it is obvious that the average scores were higher for cluster II than they were for cluster I, and that similar to what was found for the whole group, in both clusters the likelihood of competing was significantly higher if the injury was moderate rather than severe, the athlete 15 rather than 8, best rather than average and the meet an important qualifier rather than an invitational tournament. It also shows that the biggest difference for cluster II lies in the injury factor.

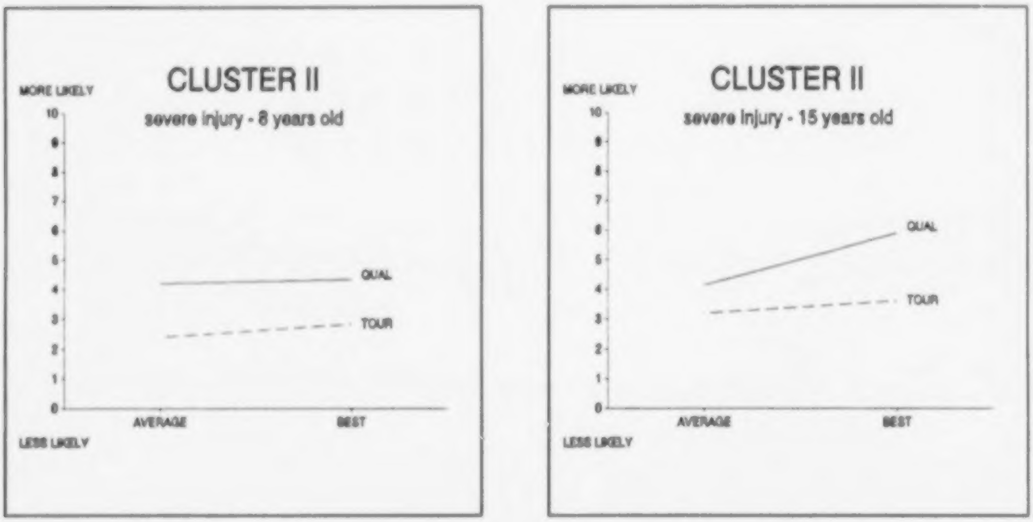
A look at the significant interactions for cluster I (Figure 4.3.4) shows that the likelihood of competing increased when the athlete was older, but increased more for a moderate injury than for a



a) p = .023

b) p = .001 c) average: p = .010
best: p = .005

b) p = .016 c) average: p = .815
best: p = .001



a) p = .013

b) p = .606

b) p = .001 c) average: p = .011
best: p = .000

Figure 4.3.5. **Four-way interaction for cluster II, broken down according to injury and age. The p -values indicate the degree of significance at the level of a) three-way interaction age*ability*meet, b) two-way interactions and c) main effect for meet.**

of competing increased for the more important competition, but increased more for a best athlete than for an average athlete. At an invitational tournament the chances of competing were virtually the same for a best and an average athlete, but at a qualifying meet, it was much more likely that the best athlete would compete. For all three of these interactions, however, the highest likelihood score would still be very low (below 3.5), indicating that, although in some situations competing might be considered more than in other situations, it would still be unlikely that the athlete would take part in the competition. The fact that these coaches assigned low scores to most or all of the scenarios left little room for fluctuation in the scores, and thus for detecting more subtle interaction effects. Their weighing of the parameters seemed to be influenced primarily by the mere fact that an injury existed. It would seem that the extent of the moderate injury was considered sufficiently severe that competing became unlikely no matter what type of athlete or meet was involved.

The directions of the effects constituting the four-way interaction found to be significant for cluster II were similar to those described for the whole group (Figure 4.3.5). The only difference was that the values were generally higher for cluster II alone, because the values in the whole group were pulled down by the lower values of cluster I.

In summary, the coaches in cluster I were generally less likely than the coaches in cluster II to allow an injured athlete to compete, and they seemed to use less complicated decision policies. The coaches in cluster II were overall more likely to allow an injured athlete to compete, especially if the injury was moderate and/or the competition important, and these coaches tended to use more complicated decision policies than the coaches in cluster I. It would seem that the major difference between the two clusters lies in the interpretation of the severity of the injury. For cluster I the weighing of the other parameters seemed to be overridden by the presence of an injury, severe or moderate, whereas for cluster II, the extent of the moderate injury did not appear to be judged as severe enough to dominate the decision outcome; therefore, the other parameters were weighted more heavily.

Differences in decision policies between competitive levels

In order to investigate whether coaches working at different competitive levels vary in their decision policies, the coaches were divided into three groups according to the highest competitive level of athletes they were coaching at the time of the interview: coaches instructing primarily class I and/or II gymnasts (n = 25), coaches training primarily class III and/or IV gymnasts (n = 20), and coaches working with gymnasts of national stream or high performance (NS/HP or 'elite') calibre (n = 13). A two-way ANOVA was carried out, with repeated measures for the four parameters varied in the scenarios, and group membership as the fifth factor (Table 4.3.3.). A least squares mean method was used to adjust for the differences in group size. The analysis showed 3 significant interactions between

Table 4.3.3. **Two-way ANOVA with repeated measures for parameter levels and competitive level as fifth factor**

SOURCE	df	F	P
group*constant #	55, 2	1.19	.310
group*injury	55, 2	9.83	.431
group*age	55, 2	7.13	.002 **
group*ability	55, 2	1.48	.236
group*meet	55, 2	6.36	.003 **
group*inj*age	55, 2	.30	.740
group*inj*ability	55, 2	1.09	.343
group*inj*meet	55, 2	1.91	.157
group*age*ability	55, 2	.82	.446
group*age*meet	55, 2	.23	.793
group*ability*meet	55, 2	1.93	.154
group*inj*age*ability	55, 2	.47	.627
group*inj*age*meet	55, 2	.05	.947
group*inj*ability*meet	55, 2	1.53	.226
group*age*ability*meet	55, 2	3.90	.026 *
group*inj*age*ab*meet	55, 2	1.15	.324

group = competitive level

group membership and parameter levels, 2 two-way (group*age and group*meet) and 1 four-way interaction (group*age*meet*ability). This means that there was no difference between the three levels in the way in which the injury affected the decisions, but that there was for certain combinations of age, meet and ability levels. A graphic representation of the four-way interaction is given in Figure 4.3.6.

Post hoc multiple comparisons between the three groups on the age*ability*meet interaction (Table 4.3.4) showed that the elite level group differed significantly from the two lower level groups for

Table 4.3.4 **Multiple comparisons between competitive levels for age*ability*meet (p <.05).**

	8AT	8BT	8AQ	8BQ	15AT	15BT	15AQ	15BQ
I&II vs. III&IV	*							
I&II vs. NS/HP			*	*			*	*
III&IV vs. NS/HP				*			*	*

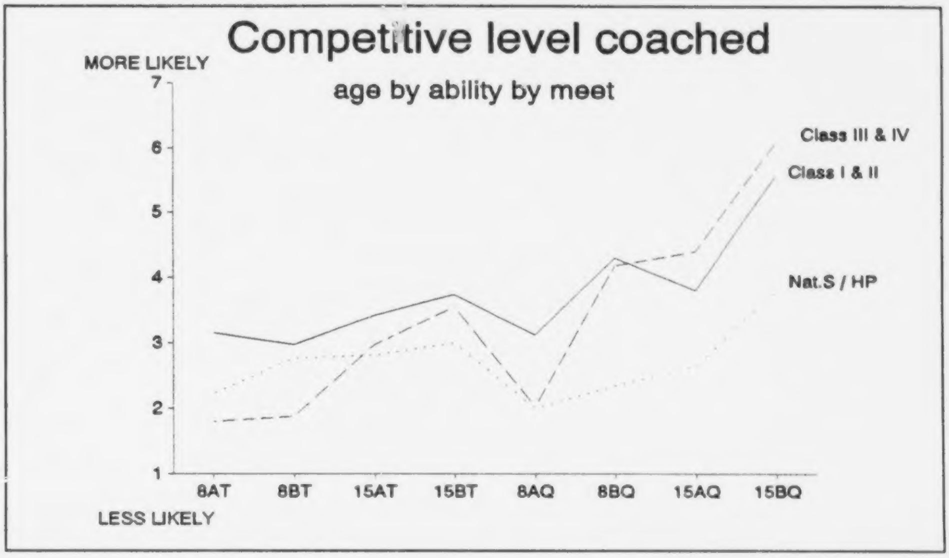


Figure 4.3.6 **Differences between competitive levels in age*ability*meet interaction.**

almost all situations involving a qualifying meet. For all these situations the likelihood of competing was significantly lower in the elite level group than in classes I to IV. Only in the case of an 8 year old average athlete was the likelihood score for a qualifying meet not significantly different from the likelihood score of class III and IV coaches. There were no significant differences between the elite and the non-elite level coaches in the likelihood of competing in a tournament. The two lower level groups differed significantly on only one combination of age, ability and meet, namely the situation of an 8 year old average athlete and a tournament; the chances of this athlete competing were significantly higher for class I and II coaches than for class III and IV coaches.

Multiple comparisons of the various combinations of age, ability and meet *within* each of the three groups (Table 4.3.5 and Figure 4.3.7) showed that the decisions of the coaches in class III and IV were influenced most by variations in these three parameters, while those of the elite level coaches were influenced least. For the latter coaches, the only combination that was significantly different from (all) the others was the situation of a 15 year old best athlete going into a qualifying meet. There was no significant difference for any of the other combinations of parameter levels. In most of these other combinations the likelihood of competing was slightly higher for tournaments than for qualifying meets, but these differences were not significant. This suggests that coaches at the elite level tend to consider competing only if the athlete is older and of higher ability and the competition is important, and even

Table 4.3.5 Significant within group differences (p < .05).

	8AT	8BT	8AQ	8BQ	15AT	15BT	15AQ	15BQ
8AT	0			1 2	2	2	2	1 2 3
8BT		0		1 2	2	2	2	1 2 3
8AQ			0	1 2	2	2	2	1 2 3
8BQ				0				2 3
15AT				2	0		2	1 2 3
15BT						0		1 2 3
15AQ							0	1 2 3
15BQ								0

1 = Class I & II 2 = Class III & IV 3 = National Stream / High Performance

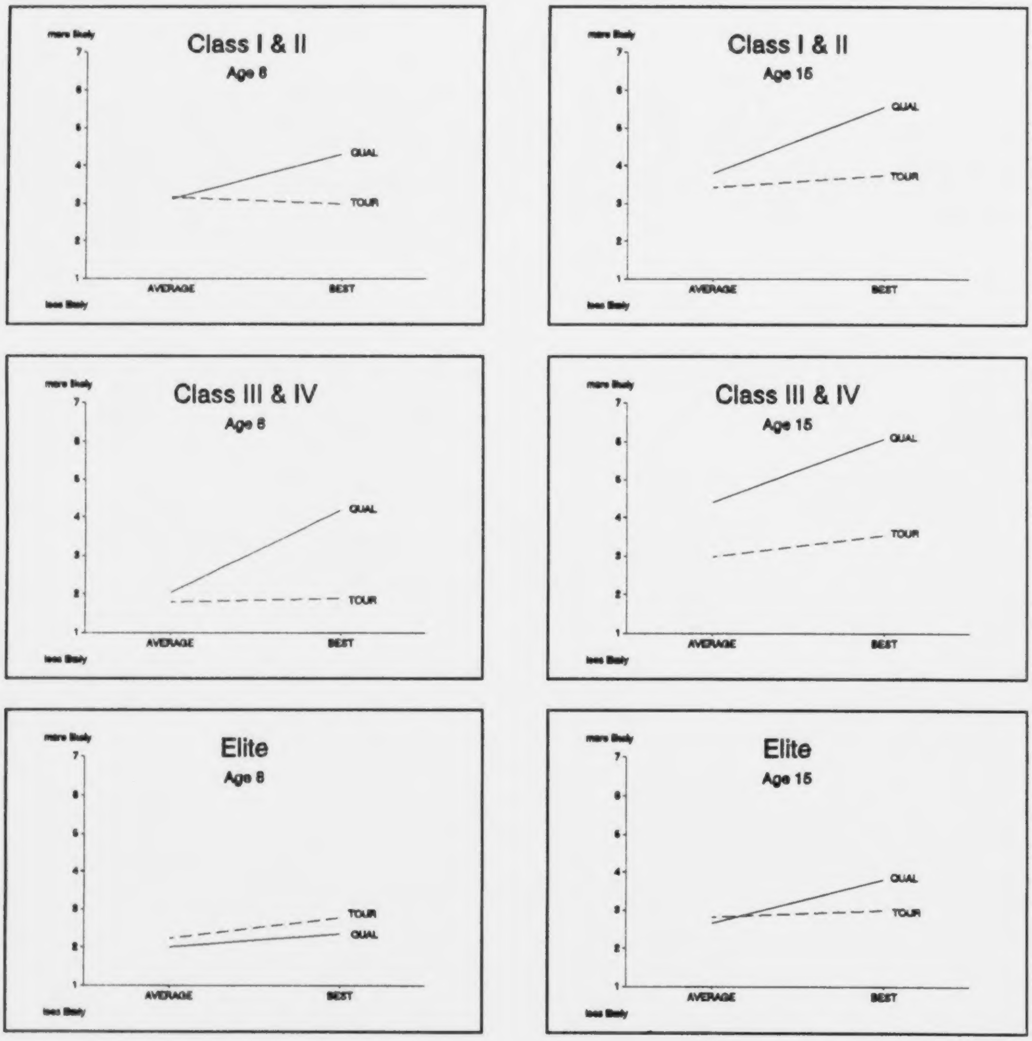


Figure 4.3.7 Age*ability*meet interaction within each competitive level.

then, the likelihood of competing is still lower than for coaches at lower competitive levels. If anything, the coaches at this level might be more likely to consider competing in a tournament than in a qualifying meet.

For the coaches in class I and II and those in class III and IV, the patterns of likelihood scores were fairly similar. In fact, there was only one significant difference between the two groups. Coaches in class I and II were more likely to allow an 8 year old average athlete to compete in a tournament than coaches in class III and IV. In both groups the likelihood of competing was always higher for a best athlete entering a qualifying competition, regardless of the age of the athlete, while the likelihood of competing for an average athlete in a qualifying meet was always lower, and generally not different from the likelihood of competing for a best athlete in a tournament. The only exception was found among class III and IV coaches regarding a 15 year old average athlete; her likelihood of competing in a qualifying meet was higher than in a tournament. Notwithstanding the similarity between the two lower level groups, the coaches in class III and IV covered a wider range of likelihood scores and made more significant distinctions than the coaches in class I and II. This suggests that the coaches at this level were most obviously affected by the different levels of age, ability and meet, and had more elaborate policies than the coaches in class I and II.

Possible difference between the two datasets

Although the data were collected in two phases, they were treated as one sample in order to increase the eventual sample size, and consequently the power of the analyses. However, there were several sources of possible bias that might have caused differences between the two data sets, namely (a) a geographical difference (coaches north of Red Deer might make their decision differently than the coaches south of Red Deer), (b) a seasonal difference (coaches might respond differently in October than they do in April, because of the phase of the competitive season), and (c) a difference in the researcher's attitude (having partly analyzed the data of the first phase of data collection might have subconsciously caused an interviewer bias).

To determine whether significant differences between the two data sets existed, a two-way ANOVA with repeated measures for the four parameters varied in the scenarios and data set as the fifth factor was carried out. Only one of the 16 main and interaction effects was significant (injury-age-ability interaction, $F(1, 62) = 4.17$, $p < .05$, which was due to a difference in the likelihood of competing for a 15 year old best athlete with a severe injury being higher for the coaches in the first data set than in the second data set, $F(1, 62) = 4.29, p < .05$). With 16 tests, this effect may have been due to chance. All the other effects were far from significant (mean p-value was .490). A chi squares analysis was also conducted, to see if the data sets differed significantly in cluster membership. Although there appeared to be a slight difference between the two data sets (cluster I contained 41.9% (13) of the coaches of the first data set and 61.3% (19) of the coaches of the second data set; cluster II contained 58.1% (18) of the coaches of the first data set and 38.7% (12) of the second data set), this difference was not significant (Chi Square (1, N = 62) = 2.340, p = .126). These analyses suggest that there was only one minor difference between the data sets in the decision policies measured, which was most likely due to a type I error. Therefore, it seems justified to treat the two data sets as one.

Summary of part III

An aggregate decision policy was calculated for the whole group of coaches. This policy revealed that each combination of parameter levels had a unique effect on the outcome of the decision. Generally, the coaches were more likely to consider letting the athlete compete if she was older and of higher ability, if the injury was moderate and the competition important, but these likelihoods were moderated by the ways in which the parameter levels were combined. The most distinctive deviation from this main tendency was the situation of an 8 year old average level athlete with a moderate injury, who was more likely to be allowed to compete in a tournament than in a qualifying competition. Another deviation was the situation of a 15 year old average athlete with a moderate injury, for whom the likelihood of competing did not differ between a qualifying and an invitational meet. For all other combinations, the likelihood of competing was higher in a qualifying meet than in a tournament. While the various combinations of parameter levels affected the likelihood of competing in a positive or negative direction, the average likelihood of competing was, for most scenarios, on the unlikely side of the scale. Only the case of a best 15 year old athlete with a moderate injury going into a qualifying competition scored on the likely side of the scale.

The aggregate policy found for the whole group was broken down in two ways, first by an internal criterion, the clustering of coaches on the basis of similar individual policies, and secondly by an external criterion, the competitive level of the gymnasts that the coaches were working with at the time of the interview.

Using the internal criterion, two clusters were found, which differed significantly in the average likelihood of competing assigned to the scenarios, and the ways in which the parameter levels of injury and those of injury in combination with meet affected the likelihood of competing. The coaches in one cluster were generally unlikely to allow the athlete to compete. Although they did differentiate between the levels of the four parameters, their likelihood scores were low for all scenarios. It seemed that for these coaches the degree of damage of either injury was sufficiently severe to keep the athlete from competing. The coaches in the second cluster were overall more likely to allow the athlete to compete, especially if the injury was moderate. If the injury was severe, the likelihood of competing was generally below the midpoint of the scale, except in the situation of a 15 year old best athlete with an important qualifying meet coming up. The decision policies of the second cluster seemed to be more complicated than that of the first cluster in that the decisions were more differentially affected by the various combinations of parameter levels.

Using the external criterion of competitive level, a comparison was made among three groups of coaches, namely those working with (a) class I and II, (b) class III and IV and (c) national stream/ high performance gymnasts. It was shown that the three groups did not differ in the way in which their decisions were affected by the degree of injury, but there were differences in the way in which the age and ability of the athlete as well as the importance of the competition affected the likelihood of competing for the three groups. The two lower level groups were fairly similar in their policies, although the coaches in class III and IV showed a bigger spread in their answers, but the policy of the elite level group differed in a number of aspects. While all three groups were willing to take more risks with a 15 year old best athlete in an important qualifying competition, the coaches at the elite level were significantly less likely to do so than the coaches at the two lower levels. Moreover, these coaches tended to be more cautious in their approach in general. Whereas the coaches in the two lower level groups were more likely to allow competing in a qualifying meet, the elite level coaches made very little distinction between tournaments and qualifying meets. If anything, they might be more apt to consider competing in a tournament. These coaches also did not differentiate very much between levels of ability or age. The two lower level groups on the other hand made quite obvious distinctions between best and average athletes, assigning higher likelihood scores to best athletes competing in qualifying meets than to average athletes competing in qualifying meets, or to either athlete in tournaments. For the class III and IV coaches the lower likelihood of competing for average athletes and in tournaments was even lower if the athlete was 8 years old. Of the three groups, the coaches at this level seemed to have the most elaborate decision policies.

PART IV: Individual differences between coaches

Introduction

In this section the relationship between cluster membership and background variables, i.e. coach characteristics, is examined, in order to see if the differences between the clusters in decision policies may be explained by any of these background variables. For this purpose, the variables were categorized and subsequently related to cluster membership through Chi square analyses.

Categorization of coach characteristics

The number of categories for each variable were kept as small as possible in order to minimize the chance of having insufficient cell frequencies (the minimum expected cell frequency for Chi square tests with two degrees of freedom or more should be five, so as not to violate the assumptions of the test distribution (Henkel, 1976)). With 62 coaches the maximum number of cells with evenly divided frequencies would be 12. Since the cluster variable had two categories, the maximum number of categories for a variable crossed with cluster membership would be six, if all cells were filled evenly. (Appendix D lists the original categories or distribution values of the coach characteristics variables).

The variable '*age*' was broken down into 3 categories, namely (1) 24 years or younger, (2) 25-29 years and (3) 30 years and older. The variable '*years of coaching experience*' was categorized into (1) less than 5 years, (2) 5-9 years, (3) 10 years or more. The variables '*highest level coached*' and '*current highest level coached*' consisted of (1) high performance/national stream, (2) class IV, (3) class III, and (4) class II or lower. The variable '*NCCP certification*' had the following categorization: (1) level I complete or partial or level II partial, (2) level II complete or level III partial, (3) level III complete or level IV partial or complete.

As a general measure of injury education, a variable called '*extent of injury education*' was constructed on the basis of the various educational experiences mentioned by the coaches. The coaches were classified as having a (1) very low, (2) low-to-moderate, (3) moderate-to-high, (4) high or (5) very high level of education in injury care and management, corresponding to similar levels of expected knowledge about the care and management of injuries. Coaches classified in the very-little group would be the ones with no education at all or with one first aid course or one workshop, or with some personal experience. Coaches in the low-moderate group would have a little more educational background, for example, personal experiences that would provide them with moderate knowledge of injuries or some Physical Education courses in combination with either a first aid course or a couple of workshops or clinics. Coaches in the high-moderate group would have participated in quite a few or many organized clinics or workshops, as well as having a first aid course, or would have a degree in Physical Education with some additional experiences. Coaches classified in the high-knowledge group would have personal experiences that would likely make them very familiar with injury care, or would have taken in many organized workshops or equivalents as well as having other experiences. Coaches classified in the very-high group either had a degree in Athletic Therapy or Physiotherapy, or a degree in Physical Education in combination with a large number of workshops and clinics. In the Chi square analyses, the latter two categories were grouped together.

Five main variables were used to describe the coaches' history of experiences with injuries, each with two categories, indicating having had this experience or not. Additional information regarding each of these five main variables was transformed into several related variables. The first variable '*Having had an ankle injury*' had as related variables (a) 'Severity of the injury', categorized into (1) none or one mild ankle injury, (2) several mild or one severe, (3) several severe or many mild, (4) many severe ankle injuries, and (b) 'Age of the first ankle injury', categorized into (1) 15 or younger and (2) 16 or older. The second main variable was '*Having had an injury that is still affecting one up to this day*', with related variables (a) 'Degree of affectance', categorized into (1) not, (2) minorly affecting, (3) moderately affecting, (4) definitely affecting; (b) 'Period since occurrence of injury', categorized into (1) 0-3 years, (2) 4-10 years, (3) more than 10 years; and (c) 'Reason that the injury is still bothersome', categorized into (1) bad luck, (2) could have been prevented, (3) don't know. The third main variable was '*Having competed with an injury*', with the related variable 'Experience of competing injured', categorized into (1) good experience, (2) bad experience, (3) neither a good nor a bad experience. The fourth main variable concerned '*Having had to miss a competition because of an injury*' and had as related variables (a) 'Experienced emotions', with categories (1) neutral experience, (2) negative experience, and (b) 'Age of missing a competition', with categories (1) 15 or younger, (2) 16 or older. The fifth main variable was '*Knowing an athlete who experienced negative consequences as a result of competing with an injury*', which had as related variables (a) 'Relationship to this athlete', categorized into (1) known personally, (2) not personally known, and (b) 'Type of negative consequences suffered', categorized into (1) physical, and (2) emotional.

Cluster membership and coach characteristics

Chi square analyses were used to evaluate the relationship between coach characteristics and cluster membership. The results are presented in Table 4.4.1.

Relationship with demographic and educational variables

No significant relationship was found between cluster membership and gender or age of the coach, nor with certification level, years of coaching experience or highest competitive level coached now or in the past. Neither was the inferred level of education in injury care and management significantly related to cluster membership. Taken separately, neither of the types of injury education (personal experiences, first aid, CPR) were significantly related to cluster membership, except for one, the number of miscellaneous organized experiences that coaches had had. Coaches who had not taken

Table 4.4.1. Relationship between cluster membership and coach characteristics

VARIABLE	N	Chi square	DF	P	Effect Size+	Power
• gender	62	0.2222	1	.637	.06	.07
• age	62	1.9797	2	.372	.18	.23
• years of coaching experience	62	0.1175	2	.943	.04	.04
• current coaching level	57	1.0572	3	.787	.14	.14
• maximum level coached	62	3.2047	3	.361	.23	.30
• level of NCCP certification	62	0.4947	2	.781	.09	.09
• highest level competed	58	3.1164	3	.374	.23	.30
• extent of education in injury care	62	1.7361	3	.629	.17	.18
a) amount of personal experiences	62	1.4756	3	.688	.15	.16
b) miscellaneous organized experiences	62	7.7411	2	.021 •	.35	.67
c) first aid	62	1.7317	2	.421	.17	.21
d) CPR	62	1.2551	1	.263	.14	.21
e) Physical Education courses	62	2.4796	4	.648	.06	.06
• ankle injury	62	3.3953	1	.065	.23	.43
a) severity of ankle injury	48	0.1076	3	.991	.05	.04
b) age first ankle injury	45	6.5830	1	.010 ••	.38	.71
• injury still affecting today	60	6.4771	1	.011 •	.32	.69
a) degree of affectance	44	0.7753	2	.679	.13	.13
b) period since	41	1.1717	2	.557	.17	.16
c) reason	33	0.4415	1	.506	.12	.12
• competing with an injury	62	0.2100	1	.647	.06	.07
a) experience of competing with an injury	39	7.0719	2	.029 •	.40	.61
• missing major competition because of an injury	62	0.5348	1	.465	.09	.11
a) experience missing competition	26	0.4895	1	.484	.14	.12
b) age missing competition	26	4.7116	1	.030 •	.42	.56
• knowing athlete who experienced negative consequences as a result of competing injured	62	6.5759	1	.010 ••	.32	.69
a) relationship to athlete	31	0.1393	1	.709	.07	.06
b) type of negative consequences	31	0.8383	1	.360	.17	.16

•• P < .01
• P < .05
+ Effect size was calculated on the basis of Phi or Cramer's V according to Cohen (1988)

any workshops or clinics in injury care and management and coaches who had taken quite a few or many of these workshops were more likely to belong to cluster I (see Table 4.4.2*f*). Coaches who had taken one or a couple of these workshops were more likely to be found in cluster II.

Relationship with injury history variables

Whereas cluster membership was not significantly related to any of the demographic variables, nor with the amount of injury education that the coaches had experienced, some significant relationships were detected with variables indicative of the coaches' history with injuries. The analyses revealed that the coaches in cluster I were more likely to (a) have had a bad experience when competing with an injury themselves, (b) personally know an athlete who had experienced negative consequences as a result of competing with an injury, (c) have experienced their first ankle injury after the age of 15, and (d) have missed an important competition because of an injury after the age of 15. The coaches in cluster

Table 4.4.2. Significant relationships between cluster membership and coach characteristics

Age first ankle injury		
	I	II
\< 15	8	17
>/ 16	14	6

a) **P < .01**

Injury still affecting		
	I	II
yes	18	24
no	14	4

b) **P < .05**

Age missed competition		
	I	II
\< 15	2	8
>/ 16	10	6

c) **P < .05**

Emotions competing injured		
	I	II
good	6	8
neither good nor bad	7	8
bad	9	1

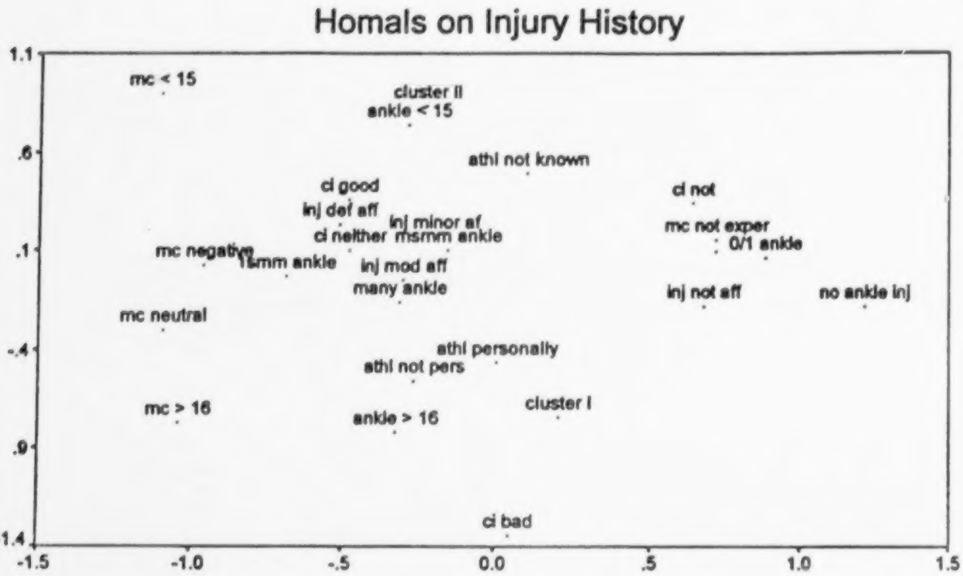
d) **P < .05**

Knowing athlete who experienced negative consequences as a result of competing injured		
	I	II
no	11	20
yes	21	10

e) **P < .01**

Injury education: miscellaneous organized experiences		
	I	II
none	21	16
one or a couple	4	12
quite a few or many	7	2

f) **P < .05**



legend

mc < 15: missed competition because of injury before or at age 15

mc > 16: missed competition because of injury after age 15

ankle < 15: first ankle injury before or at age 15

ankle > 16: first ankle injury after age 15

no ankle inj: never had ankle injury

ci good: good experience competing injured

ci neither: neutral experience competing injured

ci bad: bad experience competing injured

ci not: never competed injured

inj def aff: previous injury definitely affecting one's life

inj mod aff: previous injury moderately affecting one's life

inj minor aff: previous injury minorly affecting one's life now

mc negative: negative experience missing competition

mc neutral: neutral experience missing competition

mc not exper: never had to miss competition because of an injury

0/1 ankle: no or 1 mild ankle injury

1smm: 1 severe or more mild ankle injuries

msmm: more severe or many mild ankle injuries

many ankle: many moderate or severe ankle injuries

athl not known: did not know athlete who experienced negative consequences competing injured

athl personally: did personally know athlete who experienced negative consequences competing injured

athl not pers: did know of athlete who experienced negative consequences competing injured

Figure 4.4.1 Plot of HOMALS analysis on injury history variables.

II were more likely to (a) have experienced an ankle injury before the age of 15, (b) still somehow suffer from a past injury, (c) not know anybody who had experienced negative consequences as a result of competing with an injury, and d) have had a good or neutral experience when competing with an injury. The significant relationships are presented in Table 4.4.2, *a* through *e*.

The relationship between cluster membership and injury history variables is also nicely illustrated by a plot generated through a HOMALS analysis on these variables (see Figure 4.4.1), where the second dimension separated the coaches in cluster I from the coaches in cluster II, as well as the coaches who had had a bad experience competing injured from the ones who had had a good experience, coaches who knew or knew of an athlete who experienced negative consequences as a result of competing injured from coaches who did not know such an athlete, coaches who had had to miss an important meet because of an injury after the age of 15 from coaches who had had to miss a meet for that reason before the age of 15, and coaches who had suffered their first ankle injury after the age of 15 from those who experienced such an event before they were 15. The first dimension of this analysis distinguished coaches who had had to miss an important meet because of an injury from coaches who had never had to miss a meet for that reason and also otherwise did not have much personal experience with injuries.

Statistical inferences

Some caution must be used in interpreting these Chi squares. With 28 tests carried out on the same population, there is a possibility that one of the significant relationships occurred by chance; however, it is impossible to say which one, or if indeed this actually happened.

Despite the attempt to use few categories, some of the contingency tables still contained cells with frequencies lower than the expected frequency necessary to test for significance. This was also the case for three of the variables presented in Table 4.4.2 (*c,d,f*). Although a Monte Carlo study conducted by Knetz (1963, cited in Henkel, 1976) indicated that even relatively large infractions of the expected frequency criteria lead to rather small errors, suggesting that the probability estimates of the Chi squares may be only slightly off the correct value, prudence in the interpretation is still warranted.

A word of caution is also appropriate with respect to the interpretation of the non-significant Chi squares. Because of the sample size ($n=62$), the power of the Chi square tests was relatively low and allowed for detection of medium to large effect sizes only (medium and large defined as suggested by Cohen, 1988, p. 225). This low power suggests that the current sample size was insufficient to reliably conclude that the non-significant effect sizes were so close to zero that they were negligible. With a larger sample size the smaller effect sizes might become significant.

Summary of Part IV

Although some reservation is warranted in the interpretation of the results, they do point in a general direction, namely that cluster membership is related primarily to the types of experiences that coaches have had with injuries and with competing while injured. Sociographic variables like the age and gender of the coach, the level of NCCP certification, years of coaching experience, current competitive level coached or highest competitive level coached ever were not significantly related to cluster membership. Neither was the degree of education in injury care and management that coaches had experienced associated with cluster membership. Having had a bad experience competing injured or personally knowing somebody who suffered negative consequences as a result of competing injured were associated with membership in cluster I. Coaches in cluster II were less likely to have had such negative experiences, but were more likely to still somehow be affected by the remnants of a past injury. Furthermore, having suffered an ankle injury before the age of 15, or having had to miss an important competition before the age of 15 were associated with membership in cluster II. Coaches in cluster I were more likely to have had such experiences after the age of 15.

PART V: Quantification of considerations

Introduction

This section describes an attempt to go one step beyond the qualitative analysis and explore the relationship of the modifications, managing strategies and considerations that the coaches mentioned in response to the scenarios, with (a) the four informational parameters used in the scenarios (injury, age, ability and meet), (b) the two clusters and (c) the three levels of competitive involvement. To this end a quantification of the qualitative data was sought, in the form of frequency counts, i.e. the number of times a modification, strategy or consideration was mentioned in response to the scenarios. Because there was no deliberate attempt to collect these data in a systematic way, there were a number of problems in the analysis and interpretation of this information. Although no solid conclusions can be drawn from these data, they may offer additional insights that might be of use in future research.

Quantification

On the basis of the verbal information that the coaches provided in their answers, a list was made up of 20 categories, containing a total of 95 types of statements, representing modifications, strategies and considerations (Appendix D; in this section these 95 'types of statements' will concisely be referred to as 'statements'). The modifications and strategies were represented as 'action' statements, comprising the different things the coaches said they would do. The considerations were, for the most part, represented as statements that contained an argument indicating why competing would be less likely or more likely. Some considerations were not represented in the form of arguments, specifically statements about the risks of competing with an injury, and statements indicating that the decision would be different depending on the athlete's personality characteristics (statements 201-206 and 151-155 respectively).

The list with 95 statements was subsequently used to code the statements that the coaches made in their responses to the scenarios, as well as the comments regarding the scenarios that they made after the series of scenarios, or at the end of the interview. In cases where coaches made statements containing both arguments against and arguments in favour of competing in response to the same scenario, both types of statements would be coded for that coach and that scenario.

The outcome of the coding was synthesized into 17 matrices (1 for each of the 16 scenarios, and 1 for the separate 'comments') of 64 coaches by 95 (types of) statements, containing the frequencies with which each statement was made by each coach in relation to the different scenarios. In order to reduce these 17 matrices into one matrix, aggregate frequencies were calculated. This was done in two ways, by either summing over all the coaches or over all the scenarios. The first exercise resulted in a matrix (A) of 95 statements by 16 scenarios (and one for the 'comments'), containing the frequencies with which each of the statements was made in relation to each scenario (and in the 'comments'). The second operation produced a matrix (B) of 64 coaches by 95 statements, containing the total number of times each type of statement was mentioned by each coach during the interview, i.e. in response to the scenarios as well as after all scenarios or at the end of the interview.

These two matrices (A and B), were used to examine (a) the relationship of the statements with the two different levels of each informational parameter, (b) the relationship of the statements with cluster membership, and (c) the relationship of the statements with current competitive level coached.

Statements with highest frequencies

In total, the coaches made 1519 statements in response to the scenarios, and an additional 170 as comments after all the scenarios or at the end of the interview. An overview of the statements that were made most frequently by all coaches is presented in Box 4.5.1. The statements are shown with the absolute number of times that this type of statement was made, and also in percentages of the total number of statements (including the comments) made by all coaches. The statements presented in this

Frequencies	Statements
84	91) less likely, because an 8 year old has lots of time ahead, many more opportunities to compete; competitions at this age are not important; you don't want to wreck her this early in the game
70	122) less likely, invitationals are not important; they are just for fun; there are so many of them
69	11) compete only one or two events; compete bars and/or beam, but not all around
59	201) aggravating the injury; make it worse; injure it more; re-injure it
57	102) more likely, when they are 15 they can handle more psychologically, they know their bodies better, communicate better, you can trust their judgment
51	82) it is (only) a moderate injury
49	75) less likely if she is still limping
46	112) less likely, she is average and not expected to do well or place, not worth the risk; it is not important to compete
42	12) water down the level of difficulty of her routines; change or adapt her routines
40	14) pull her out of the competition if necessary; see how it goes
36	72) because it is a severe injury
34	162) quite likely, very likely if she really wants to, if she is eager, keen (and if....)
34	13) tape; support the foot well; do a good warm-up
33	101) more likely, because she is getting near the end of her competitive career; she won't have many opportunities for competing left
32	126) more likely, because a qualifier is an important meet
31	76) if there is still swelling
31	52) decide on the day of the competition, generally during the warm-up
31	33) consult with the parents to see what they think about the situation
29	165) more likely if she thinks she can do it

Box 4.5.1. Statements made most frequently by the whole group of coaches. The first column lists the frequencies, the second column indicates the number assigned to the statement (see Appendix D).

box reflect 50.7 % of the total number of statements made.

As Box 4.5.1 shows, the statements that were made most frequently were directed mostly at the four parameters varied in the scenarios. They also tended to support the overall decision policies found in the conjoint analysis, i.e. more 'less likely' arguments for 8 year old athletes, athletes of average ability, invitational tournaments and severe injuries, and more 'more likely' arguments for 15 year old athletes, qualifying meets and moderate injuries. Modifications to the decision to compete full out were also mentioned relatively frequently, and so was the fact that the athlete was eager to compete, which was a given in all scenarios. The athlete's keenness to compete was used fairly frequently as an argument in favour of competing.

The relationship between statements and parameter levels

Calculation of frequency indicators

Matrix A was used in the next step, in which the statements were linked to the parameter levels, in order to see if some statements were made more often in association with one parameter level than with the other. However, a problem arose in this process. Due to the fact that the coaches were generally inclined to make most of their statements after the first couple of scenarios, the parameter levels in those scenarios tended to 'receive' more statements than the parameter levels not present in those scenarios. An overview of the total number of statements made after each scenario is given in Table 4.5.1.

Table 4.5.1. The total number of statements made in response to the consecutive scenarios. The codes refer to the levels of the 4 parameters present in each scenario: M = moderate injury, Sv = severe injury, 8 = 8 years old, 15 = 15 years old, A = average, B = best, T = tournament, Q = qualifying meet.

1	2	3	4	5	6	7	8
M8AQ	Sv8BQ	Sv8BT	M15AQ	M8BT	M15BQ	M15AT	M8AT
215	203	98	160	70	136	76	70
9	10	11	12	13	14	15	16
Sv15BQ	M15AT	Sv15AQ	Sv15BT	M8BQ	Sv8AT	Sv15AT	Sv8AQ
117	52	86	43	71	27	35	60

Order effect

Although there was not a steady decline with each consecutive scenario, it was obvious that more statements were made at the beginning of the interview than near the end. In order to correct for this order effect, the frequencies per statement for each scenario were calculated as percentages (p) of the total number of statements made in response to that scenario. For example, statement 12 was made 5 times in response to scenario 5, and 2 times in response to scenario 16. The percentage for statement 12 for scenario 5 became (5 / 70) x 100 = 7.14 and for scenario 16 (2 / 60) x 100 = 3.33. Despite the correction for this order effect however, there were a couple of occasions where the association between statements and parameter levels still appeared to be affected. Specifically this seemed to be the case for the parameter levels 'age 8' and 'qualifying competition', which were both part of the first two scenarios, whereas their counterparts ('age 15' and 'invitational tournament') did not appear until the third and fourth scenario, and statements regarding the injury and the risks involved, which were more likely to be made after the detailed description of the injury in the first two scenarios.

Association with parameter levels

The percentages (p) were subsequently used in the calculation of the number of times a statement was mentioned in association with a parameter level. This frequency was expressed as a ratio (r) calculated by adding the percentages associated with all 8 scenarios containing the parameter level of interest, then dividing by 8. For example, the number of times statement 12 was made in relation to a qualifying meet (Rq) was calculated as the sum of the percentages (p) of the number of times statement 12 was made in response to scenarios 1 + 2 + 4 + 6 + 9 + 11 + 13 + 16, divided by 8.

In order to compare the two levels per parameter, absolute and relative differences between the ratio scores (r) were calculated. For example, the ratio for the total number of times statement 12 was made in response to scenarios containing a qualifying meet (Rq), was 2.05; the ratio for the total number of times statement 12 was made in response to scenarios containing an invitational tournament (Rt) was 3.33. The absolute difference between the two parameter levels for this statement was 2.05 - 3.33 = -1.28, indicating that statement 12 was mentioned more in association with a tournament than with a qualifying meet, with a difference of 1.28 between ratios. The relative difference between the two parameter levels was calculated as a proportion of the ratios, i.e.: (2.05 - 3.33) / (2.05 + 3.33) = -.24, indicating that there was approximately a quarter increase in the number of times that statement 12 was mentioned in association with a tournament in comparison to the number of times that it was mentioned in association with a qualifying meet.

Comparisons between parameter levels

To be able to compare among the statements and determine which statements were associated more with one parameter level and which ones more with the other parameter level, a two-step selection process was used. (1) Since there were 95 statements, the expected value for each statement, in terms of percentages (p) of the total number of statements, was 100/95 = 1.05. This expected value also holds for the ratio scores taken over all the scenarios containing a particular parameter level. The statements that received a percentage or ratio score of less than 1.05 were the ones that were mentioned the least number of times, and it was decided to leave those statements out of the comparison, because of their lower frequency of occurrence. When comparing the two levels for each parameter, only those statements were taken into consideration that had a ratio score of 1.05 or higher for one or both of the parameter levels. (2) The relative differences between the parameter levels were subsequently used to decide which differences were worthwhile considering. It was decided to only look at those statements for which the relative difference between the two parameter levels was .33 or higher. This means that only those statements where the difference between the two parameter levels was at least one third of the total of the number of times that that statement was mentioned in relation to both parameter levels, were included in the description. For example, statement 78 received a ratio score of .82 in relation to the scenarios containing a qualifying meet, and of .00 in relation to the scenarios containing an invitational tournament, indicating that it was not mentioned at all after any of the tournament-scenarios. This statement was not included in the comparison between qualifying and invitational meets, because it did not reach the 1.05 criterion under either the qualifying or the tournament 'condition', even though the relative difference between the two was 1.00, i.e. [(.82 - .00) / (.82+.00)]. Statement

14 received a ratio score of 3.43 in relation to qualifying meet scenarios, and of 2.06 in relation to tournament scenarios. Even though this statement reached ratio scores of far higher than 1.05 for both the parameter levels, it was not included in the description of the differences between qualifying and invitational meets, because the relative difference between these percentages was only .25, i.e. [(3.43 - 2.06) / (3.43 + 2.06)]. Statement 33 received a percentage of 2.33 in relation to qualifying meet scenarios and of .66 in relation to invitational tournament scenarios. This statement was included in the comparison, because it had a percentage of higher than 1.05 for one of the parameter levels, and a relative difference of .56, i.e. [(2.33 - .66) / (2.33 + .66)], higher than .33.

In summary, the statements presented below indicating that they were mentioned more often in association with one parameter level than with the other, are those that occupied more than 1.05% of the total number of statements made for that parameter level, and those where the difference between the two parameter levels comprised at least one third of the number of times this statement was made for both parameter levels.

The difference between moderate and severe injuries

Sixteen of the 95 statements satisfied the two above-mentioned criteria in the comparison between scenarios containing a moderate injury and those containing a severe injury. They are shown in Box 4.5.2. The majority of the injury-specific considerations regarding the effect of the injury on the likelihood of competing (statements 71 to 84, Appendix D) did not meet the criteria for inclusion, indicating that they were not associated more with either moderate or severe injury scenarios. For statements 77, 78, 79, 81 and 84 this was due to the fact that these statements were not mentioned a sufficient number of times, for statements 71, 73, 75 and 76, the relative differences between a severe and a moderate injury was smaller than .33, indicating that there was little difference between a moderate and a severe injury in the number of statements suggesting that competing was less likely because there had not been enough time to recover, or if there was still pain or swelling or the athlete was still limping. The only injury-specific considerations that were included were 72, 74, 82 and 83. Statements 72, 74 and 83 were associated more with severe injury scenarios. Statement 82, not surprisingly, was made exclusively in association with a moderate injury. Statements interpreting the situation in a more favourable way, making competing more likely, were made more often in response to moderate injury scenarios (statements 82, 162, 142, 124, 117, 123). A tendency to delay the decision (52) until the day of the competition and to opt for competing with a well supported or taped ankle (13) was also found more often in association with a moderate injury, whereas the choice of taking the athlete to the meet to watch was made more often in association with a severe injury.

Commenting on the risk of making the injury worse (201) appeared to happen more in

Statements made more in association with "moderate injury" scenarios

Absolute	*Proportional*	
6.26	1.00	82) more likely, it is (only) a moderate injury
1.59	.42	162) quite likely, very likely if she really wants to, if she is eager, keen (and if....)
1.41	.54	142) more likely, because it may be a learning experience for her competitively
1.34	.35	52) make the decision on the day of the competition
1.32	.62	124) more likely if this tournament was a peaking meet; if it was an important meet in the athlete's overall plan; if it was important for exposure to the judges
1.31	.40	13) tape; support the foot well, do a good warm-up
.79	.42	117) more likely, it is important that she competes, she is a best athlete; this meet is important for her
.77	.43	123) more likely, there is not as much stress at a tournament; you can be more flexible, do only one or two events

Statements made more in association with "severe injury" scenarios

Absolute	*Proportional*	
5.05	.95	72) less likely, because it is a severe injury
1.77	.33	21) take her to the meet to watch
1.14	.45	201) risk aggravating the injury, hurting it more, re-injuring it
.97	.76	74) less likely if she has not trained on it very much; if she has not done much weight bearing
.85	.56	121) invitational or qualifier makes no difference
.78	.47	83) more likely if it does not hurt, if there is no pain
.71	.42	32) obtaining medical advice (e.g."What did the doctor say?")
.68	.39	92) less likely, 8 year olds are psychologically not ready to provide reliable information or to handle competing with an injury

Box 4.5.2. Statements differentiating most between the levels of injury. The columns refer to the absolute and proportional differences between the percentages for each statement.

response to severe injury scenarios, and these scenarios also generated more questions or remarks regarding a medical opinion. It is interesting that a severe injury was also associated more with the statement that the type of competition made no difference in one's decision. This may indicate that it is more likely that the severity of the injury will override the importance of the meet if the injury is perceived to be more severe.

The difference between 8 year old and 15 year old athletes

The only age-specific statements (90's and 100's) that satisfied the first criterion of having been mentioned a sufficient number of times were statements 101 and 102 for age 15, and 91 and 92 for age 8. These statements showed that the reverse of the arguments that were used in favour of competing a 15 year old athlete, the fact that she was more mature and at the end of her career, were used against competing an 8 year old (see Box 4.5.3).

Generally, age 15 scenarios were associated more with strategy statements, whereas age 8 scenarios were associated more with injury statements, although the latter may be due to the fact that the first two scenarios, including the detailed description of the injuries and receiving a major proportion of the negative injury (70's) and risk (200's) statements, both contained age 8 athletes. Clearly, at age

Statements made more often in association with "age 15" scenarios

Absolute	*Proportional*	
6.86	1.00	102) more likely, 15 year old athletes can handle more psychologically, they know their bodies better, communicate better, you can trust their judgment
3.60	1.00	101) more likely, because she is getting near the end of her competitive career; she won't have many opportunities for competing left
1.76	.83	124) more likely if this tournament was a peaking meet; if it was an important meet in the athlete's overall plan; if it was important for exposure to the judges
1.64	.82	46) the athlete has some input
1.47	.93	45) the athlete has quite a bit of input in the decision; coach and athlete make the decision together
1.05	.69	42) it is up to the athlete and/or her parents to decide, but the coach makes sure his/her opinion is heard
.94	.50	117) B, more likely, it is important that she competes; this meet is important for her; she might do well in this meet
.88	.65	41) the decision is up to the athlete and/or her parents
.74	.49	121) qualifying meet or tournament makes no difference

Statements made more often in association with "age 8" scenarios

Absolute	*Proportional*	
9.65	1.00	91) less likely, because she has lots of time ahead, many more opportunities to compete; competitions at this age are not important; you don't want to wreck her this early in the game
2.03	.49	201) aggravating the injury; make it worse; injure it more; re-injure it
1.60	.37	75) if she is still limping
1.20	.50	76) if there is still swelling
1.18	.39	33) consult with the parents to see what they think about the situation
1.03	.59	92) less likely, 8 year olds are psychologically not ready to handle competing with an injury, or to provide reliable information about the injury
.87	.73	74) if she has not trained on it very much; if she has not done many weight bearing activities
.87	.56	43) it is the coach's decision, but there is the possibility that the parents will reverse the decision
.76	.46	83) more likely if it does not hurt, if there is no pain
.66	.37	123) more likely, there is not as much stress at a tournament; you can be more flexible, do only one or two events

Box 4.5.3. Statements differentiating most between the levels of age. The columns refer to the absolute and proportional differences between the percentages of the levels for each statement.

15, there was a greater tendency to leave the decision to the athlete or to give her input into the decision (46, 45, 42, 41). For an age 8 athlete, the coaches were more likely to comment that they would consult with the parents, or that, if they made the decision, there was always the possibility that the parents would step in and reverse the decision. The coaches used different types of arguments in favour of competing in an invitational tournament for the two age groups (123 and 124), implying that perhaps these types of meets (which were generally considered unimportant) served a different function for older athletes than for younger athletes. The fact that the argument 'competing in a qualifying meet is important if the athlete is one of the best', came up more frequently in relation to age 15 scenarios, suggests that the ability level of the gymnast especially comes into play when the athlete is older.

It is interesting that statements indicating that the type of meet did not make a difference in one's decision were made more often in response to age 15 scenarios; such statements were generally made to indicate that it was the injury that was of concern, not the type of meet. Why this statement was made more in association with 15 year old athletes is hard to say. Similarly, why the comment 'more likely if it does not hurt' came up more often in association with 8 year old scenarios is difficult to explain. It is possible that this is still a result of the order effect.

The difference between average and best athletes

Three of the six statements that exclusively mentioned an average or best athlete (112 to 117) satisfied the criteria for inclusion, namely 116 and 117 for best athletes, and 112 for average athletes (see Box 4.5.4). It is interesting to note that the strategy of obtaining medical advice through personal communication with a medically trained individual was mentioned more often in response to scenarios containing best athletes, whereas the strategy of talking with the athlete to find out whether she thinks she can compete (34) and giving the athlete some input (46), were mentioned more often in association with average athlete scenarios. This suggests that coaches may use different sources of information in their decision making depending on the ability level of the athlete.

The argument that an 8 year old athlete would not be mature enough to handle competing with an injury was made more often in relation to average athlete scenarios, which may mean that there is a difference in perception of the mental capabilities of average and best athletes at this age. Possibly,

Statements made more often in association with "best athlete" scenarios

Absolute	*Proportional*	
2.57	1.00	116) less likely, you don't want to risk aggravating the injury with your Best athlete; you don't want to risk a best athlete's future when she is young, or at an unimportant competition
1.89	1.00	117) more likely, she is one of the best, it is important that she competes; this meet is important for her; she might do well in this meet
1.12	.33	125) depending on when the next qualifying meet is after this tournament
1.03	.39	31) obtaining medical advice through personal communication with a medical person
.83	.53	123) more likely, there is not as much stress at a tournament; you can be more flexible; do only one or two events

Statements made more often in association with "average athlete" scenarios

Absolute	*Proportional*	
5.82	1.00	112) less likely, she is average and not expected to do well or place, not worth the risk
1.76	.53	34) talk with the athlete to get her opinion on whether she thinks she can compete
1.43	.61	73) less likely, if it hurts; if there is still pain
1.22	.72	111) it does not matter whether she is average or best
1.20	.60	46) the athlete has some input
1.02	.58	92) less likely, 8 year old athletes are psychologically not ready to handle competing with an injury, to provide reliable information about the injury
.75	.45	83) more likely if it does not hurt, if there is no pain

Box 4.5.4. Statements distinguishing most between the two levels of ability. The two columns indicate the absolute and proportional differences between the percentages per statement per level.

a best 8 year old is more likely to be perceived as having the ability to handle competing with an injury, whereas an average 8 year old is less likely to be perceived as having this ability. It is also worth taking note of the fact that the considerations regarding pain (73, 83) were mentioned more often in relation to average athletes, which may indicate that pain is another informational component that is used differently depending on the ability level of the athlete. That the statement "it does not matter whether she is average or best" was associated more with average athlete scenarios may be an indication that the contrast between average and best athletes in the research design became more apparent to coaches when the average ability of an athlete was emphasized.

Statements made more often in association with "qualifying meet" scenarios

Absolute	*Proportional*	
3.77	1.00	126) more likely, because a qualifier is an important meet
2.36	.55	75) less likely, if she is still limping
1.71	.52	13) tape; support the foot well; do a good warm-up
1.67	.56	33) consult with the parents to see what they think about the situation
1.57	.83	117) more likely, she is one of the best, it is important that she competes; this meet is important for her: she might do well in this meet
1.39	1.00	127) depending on when this qualifying meet is, how important it is, whether it can be petitioned
1.37	.36	162) quite likely if she really wants to
1.27	1.00	74) less likely if she has not trained on it very much; if she has not done many weight bearing activities
1.24	1.00	23) petitioning; medical bye
1.22	1.00	131) less likely, because it is unlikely that she will be able to do her moves/routines/skills well enough to make it worthwhile; to get through her routines
1.18	.78	62) talk with the athlete, to explain or justify why she can not compete; to convince the athlete and/or her parents that she is better off not competing
1.12	1.00	81) more likely, there has been enough time to recover; she has been off it for a week; it has been 3 weeks
1.00	.48	71) less likely, there has not been enough time to recover; it has only been a week, 3 weeks
.86	.55	61) talk with the athlete to assure that she has realistic expectations about competing
.85	.59	203) risking permanent damage; chronic injury; hurting her for life

Statements made more often in association with "invitational tournament" scenarios

Absolute	*Proportional*	
13.37	1.00	122) less likely, invitationals are not important; they are just for fun; there are so many of them
5.09	.47	11) compete only one or two events; compete bars and/or beam, but not all around
3.37	1.00	125) depending on when the next qualifying meet is
1.92	.76	21) take her to the meet to watch
1.91	.90	124) more likely if this tournament was a peaking meet; if it was an important meet in the athlete's overall plan; if it was important for exposure to the judges
1.97	1.00	123) more likely, there is not as much stress at a tournament; you can be more flexible; do only one or two events
1.21	.81	121) it does not matter whether it is an invitational tournament or qualifying meet
1.19	.46	116) less likely, you don't want to risk aggravating the injury with your best athlete; you don't want to risk a best athlete's future when she is young, or at an unimportant competition
.96	.55	92) less likely, 8 year olds are psychologically not ready to handle an injury, to provide reliable information or to compete under stress
.94	.36	142) more likely, because it may be a learning experience for her competitively
.58	.38	42) the decision is up to the athlete and/or her parents, but the coach will give her/his opinion

Box 4.5.5. Statements differentiating most between the two levels of meet. The columns refer to the absolute and proportional differences between the percentages for each statement.

The difference between qualifying and invitational meets

The comparison between the two levels of meet yielded the most statements that satisfied the two criteria outlined above, namely 31. They are shown in Box 4.5.5. As the first two scenarios, containing the more detailed description of the injury, both included qualifying meets, it is not surprising that more of the statements regarding the injury (70's and 80's, Appendix D) were associated with the qualifying meet.

Supporting the conjoint results, the statement made most often in association with a qualifying meet was that competing was more likely because it was an important meet, and with a tournament, that competing was less likely because tournaments were not important. Other statements that were mentioned exclusively in association with a tournament were 125, 124 and 123, those mentioned exclusively in association with a qualifying meet 127, 131, 74, 23 and 81. There seemed to be a difference in the types of modifications associated with the two sorts of meets. The modification of competing only one or two events (11) was mentioned more often in association with a tournament, whereas taping was more likely to be emphasized in association with a qualifying meet. The athlete's eagerness to compete was also mentioned more often in relation to a qualifying meet, as an argument towards competing.

Similar to the situation with average and best athletes, the comment "it does not matter what kind of meet it is" was associated more with tournament scenarios, which may be an indication that the contrast between the two types of meet in the research design became more apparent to coaches when the less important meet was emphasized. The strategy of talking with the gymnast and/or the parents appeared to be more important before a qualifying meet (61, 62, 33), possibly because more explanations are required for the decision not to compete when the meet is considered a significant competition.

There seemed to be a clear distinction in the treatment of best athletes depending on the type of meet involved. If the meet was a qualifier, the coaches were more likely to use the argument "It is important for her to compete in this meet", whereas if the meet was an invitational, the reasoning was that one did not want to jeopardize the athlete's immediate or more distant future by risking aggravation of the injury at an unimportant meet.

Statements differentiating between the two clusters

For the comparison between the two clusters matrix B was used, and combined with the main data matrix generated for use in the analyses described in part I, III and IV of this chapter.

Number of statements

In total, cluster I made 628 statements in response to the scenarios, and an additional 84 as comments at the end of the scenarios or at the end of the interview. Cluster II made 813 statements in total and an additional 82 as comments. This means an average of 22.3 statements per coach for the coaches in cluster I, and an average of 29.8 statements per coach for the coaches in cluster II, which constituted a significant difference (two-tailed probability t-test, t (40, 67) = -2.18, $p < .05$), demonstrating that overall, the coaches in cluster II made more statements than the coaches in cluster I. A breakdown of this difference according to the nature of the statements made, showed that the difference was mainly due to statements about modifications (statements 11 to 14, Appendix D). The coaches in cluster II made more modification statements than the coaches in cluster I (114 vs. 64; t (44, 24) = -2.37, $p < .05$). This is understandable. As the coaches in cluster II were more likely to allow the athlete to compete, it seems logical that they would implement more modifications than the coaches in cluster I who were less likely to allow the athlete to compete. Without participation there is no need for modifications.

Cluster II also made more statements containing strategies (statements 20-62, Appendix D) and considerations (statements 70-206, Appendix D), 146 vs. 120 and 635 vs. 528, respectively, but these differences were not significant (t-tests p = .302 and p = .064 respectively).

Contents of statements

Since the decision policies separated the two clusters on the basis of their average likelihood of competing (the constant), the injury and the injury-meet interaction, the comparison of the statements between the two clusters was first directed at the statements related to these factors. For this purpose, a number of statements were taken together. Two new variables were created, one by summing the frequencies of all statements with a negative direction, i.e. all "less likely" statements (71-79, 91, 92, 93, 95, 104, 112, 113, 114, 116, 121, 131, 133, 141, 161, 164, 166, 172, 191, 193, 201-205, Appendix D), the other by summing the frequencies of all statements with a positive direction, i.e. all "more likely" statements (81-84, 94, 101, 102, 103, 115, 117, 123, 124, 126, 132, 142-147, 162, 163, 165, 173, 181, 192, 206). Two-tailed probability t-tests on these two sums revealed that there was no significant difference between the two clusters in the total number of "less likely" statements that they made (p = .539), but that there was a significant difference in the number of "more likely" statements that were made (t (49, 53) = - 3.20, $p < .01$). The coaches in cluster II made more of those statements (8.5 on average) than the coaches in cluster I (4.7 on average), demonstrating that the coaches in cluster II supported their higher likelihood scores with a higher number of "more likely" statements. To compare the statements made about the symptoms of the injury, all negative injury interpretations were combined (71-79) into one variable and all positive injury interpretations (81-84) into another variable. Two-tailed probability t-tests showed that the two clusters did not differ significantly in the number of statements that they made regarding negative injury interpretations (p = .579), but they did differ significantly in the number of statements made regarding positive injury interpretations (t (55, 47) = - 2.41, $p < .05$). The coaches in cluster II made more of those statements (1.6 on average) than the coaches in cluster I (.8 on average), indicating that the coaches in cluster II were more likely to interpret the symptoms of the injury as less serious. A combination of all statements made regarding meet (121-127) also revealed a significant difference between the two clusters (t (44, 58) = - 2.67, $p < .05$), with cluster II making more statements about the type of competition than cluster I.

As the use of neither univariate nor multi-variate t-tests was useful to compare the other statements between the clusters because of problems with group size, significance levels and low power, further exploration of the data regarding differences on any of the individual statements between the clusters was conducted by employing an analysis similar to the one described above. Average frequencies were calculated for each statement within a cluster, by dividing the number of times the statement was mentioned within the cluster by the number of coaches in that cluster. Furthermore, by dividing the average frequency over all the statements per cluster by 95, the expected frequency value per statement was calculated (22.3 / 95 = .23 for cluster I and 29.8 / 95 = .31 for cluster II). To limit the number of statements involved in the comparison to those that were mentioned a reasonable number of times, the statements that received average frequency scores below the expected frequency value for both

Statements made more often by cluster I	
1.00	79) less likely, it is not ready; it is not recovered; it is still weak
1.00	95) we don't compete 8 year old kids
1.00	195) if it was national of international level it would be different
0.87	23) try to petition the gymnast on to the team
0.47	203) risking permanent damage; chronic injury; hurting her for life
0.44	74) less likely if she has not trained on it very much; if she has not done much weight bearing activities
0.34	78) less likely if she is still favouring the injury
Statements made more often by cluster II	
1.00	61) talk with the athlete, to assure that the athlete has realistic expectations about competing (e.g. "We are not going in this to win")
0.78	41) it is up to the athlete and/or her parents
0.79	125) depending on when the next qualifying meet is after this tournament
0.60	162) quite likely, very likely if she really wants to, if she is eager, keen (and if....)
0.48	151) motivation, keenness, eagerness, ambition as personal characteristics that would make a difference
0.45	14) pull her out of the competition if necessary; see how it goes
0.43	127) depending on when this qualifying meet is; whether it can be petitioned
0.43	142) more likely, because it may be a learning experience for her competitively
0.40	11) compete only one or two events
0.40	126) more likely, because a qualifier is an important meet

Box 4.5.6 Statements differentiating most between the two clusters. The first column represents the relative difference between the two clusters.

clusters were excluded from the comparison between the two clusters. Therefore, only those statements that received an average score higher than the expected frequency were selected for comparison between the two clusters. For the remaining statements absolute (Cluster I - Cluster II) and relative [(Cluster I - Cluster II) / (Cluster I + Cluster II)] differences were calculated. Statements with relative differences of .33 or more are reported in Box 4.5.6. This method showed that more individual statements interpreting the injury symptoms in a negative way (79, 74, 78) were associated with cluster I. The coaches in this cluster were also more likely to mention the risk of doing permanent damage when competing on the injury, and to indicate the option of petitioning. In addition, the cluster I coaches more frequently commented that they did not compete 8 year old athletes even when they were healthy (95). It is interesting that the coaches in this cluster were also more likely to think that they might make their decisions differently if they were dealing with national or international level gymnasts (195). The coaches in cluster II made more statements involving the timing and importance of the competition (125, 126, 127), and more statements about modifications to competing (11, 14) and actions they would undertake when they allowed the athlete to compete (61). The coaches in this cluster were also more likely to say that the athlete's motivation or keenness made a difference in their decision (155), and that they would be quite prepared to let the athlete compete if she was very eager (162). In addition, they were more likely to argue that they would allow competing, because the experience would be useful for the athlete in her competitive career (142). As well, they more commonly stated that they would use the strategy of leaving the decision to the athlete and/or her parents.

Statements differentiating between coaches at different competitive levels

Matrix B was also used for the comparison between the statements made by each of the three competitive level groups. Coaches in class I and II made 573 statements (an average of 22.9 per coach), coaches in class III and IV 561 (an average of 28.1 per coach) and coaches working at the national stream/high performance level 389 (an average of 29.9 per coach), differences that were not significant (ANOVA, *F* (2, 55) = 1.3062, *p* = .2801). A procedure similar to the one employed above was used to compare the statements between the three groups. First, average frequencies were calculated per statement per group, by dividing the number of times a statement was made within a group by the number of coaches in that group. Subsequently, only those statements were considered for comparison that had a frequency ratio above the expected average frequency (22.9 / 95 = .24 for class I and II; 28.1 / 95 = .30 for class III and IV, and 29.9 / 95 = .32 for national stream/high performance). Next, absolute and relative differences in frequency ratios per statement were calculated for each combination of two groups, as well as for each group in comparison to both other groups combined. The statements reported (see Box 4.5.7.a-c) as distinguishing most between the various groups were those with a relative difference of .33 or more.

The elite level coaches (national stream/high performance) made quite a few statements more often than the coaches in both other groups. The coaches in class I and II, on the other hand, only made a few statements more often than the coaches in the higher level groups. A strategy that differentiated substantially between the elite level coaches and the lower level coaches involved the timing of the decision (51, 52). Lower level coaches, the ones in class III and IV in particular, stated more frequently that they would delay the decision until the day of the competition. Elite level coaches on the other hand, stated more frequently that they would make the decision earlier than the night before the competition. Elite level coaches also made more statements indicating that the advice of a medical doctor would be important in their decision (171, 172); as well, they were more likely to comment that they would personally consult with the doctor or physiotherapist about the risks involved in competing on the injury (31). Furthermore, the possibility of injuring the opposite limb (202) came up more frequently in the responses of the elite level coaches than in those of the lower level coaches, as did the belief that the recovery time had not been sufficient for the injury to heal properly (71). The

Statements made more by class I & II coaches than by other level coaches

.45	43) it is the coach's decision, but there is the possibility that the parents will reverse the decision
.60	164) it may be considered if she really wants to, but I would try to convince her not to, hold her back

Statements made more by class I&II coaches than by class III&IV coaches

.70	111) It does not matter whether she is average or best
.41	141) less likely, because it may be a negative experience (e.g. might undermine her confidence, motivation)

Statements made more by class I&II coaches than by national stream/high performance coaches

1.0	33) consult with the parents to see what they think about the situation
1.0	43) it is the coach's decision, but there is the possibility that the parents will reverse the decision
.74	52) make the decision later, on the day of the competition, generally during the warm-up
.51	41) it is up to the athlete and/or her parents
.39	13) tape; support the foot well; do a good warm-up
.39	14) pull her out of the competition if necessary; see how it goes

Statements made more by other level coaches than by class I&II coaches

.77	23) petitioning; medical bye
.53	46) the athlete has some input
.50	171) if the doctor said okay, then competing would depend on other factors
.42	102) more likely, 15 year olds can handle more psychologically, they know their body better, communicate better
.42	116) less likely, you don't want to risk aggravating the injury with your Best athlete; you don't want to risk a Best athlete's future when she is young, or at an unimportant competition
.42	132) more likely, if she can do her moves/routines/skills; if she did condition well; if she can land on it
.36	71) there has not been enough time to recover; it has only been a week, 3 weeks

Box 4.5.7a. **Statements made by coaches in class I and II in relation to other levels. The first column shows the relative differences in frequencies.**

remaining level of performance that the athlete would be able to attain with the injury also appeared more often in the responses of the elite level coaches (132, 134). In addition, it seemed that these coaches were more flexible in their interpretation of 'an important qualifying competition', as they commented more often that their decision would depend on how important this qualifying meet was (127) in the athlete's overall plan; as well, they suggested more that they would try to petition the athlete rather than compete her. They also were less likely to state that competing was important be-

Statements made more by class III&IV coaches than by other level coaches

.67	92) less likely, 8 year olds are psychologically not ready to provide reliable information, to compete under stress
.63	124) more likely if this tournament was a peaking meet; if it was an important meet in the athlete's overall plan
.46	126) more likely, because a qualifying competition is an important meet
.39	81) there has been enough time to recover; she has been off it for a week; it has been 3 weeks
.39	102) more likely, 15 year olds can handle more psychologically, they know their body better, communicate better
.37	101) more likely, because at 15 she is getting near the end of her competitive career
.34	13) tape; support the foot well; do a good warm-up

Statements made more by class III&IV coaches than by class I&II coaches

.79	124) more likely if this tournament was a peaking meet; if it was an important meet in the athlete's overall plan
.67	92) less likely, 8 year olds are psychologically not ready to provide reliable information, to compete under stress
.54	46) the athlete has some input
.40	126) more likely, because a qualifying competition is an important meet
.33	34) talk with the athlete to get her opinion on whether she thinks she can compete
.33	131) less likely, because it is unlikely that she will be able to get through her routines

Statements made more by class III&IV coaches than by national stream/high performance coaches

1.0	33) consult with the parents to see what they think about the situation
1.0	43) it is the coach's decision, but there is the possibility that the parents will reverse the decision
.73	52) delay the decision until the day of the competition, generally during the warm-up
.68	92) less likely, 8 year olds are psychologically not ready to provide reliable information, to compete under stress
.59	41) it is up to the athlete and/or her parents
.59	81) there has been enough time to recover; she has been off it for a week; it has been 3 weeks
.57	13) tape; support the foot well; do a good warm-up
.57	126) more likely, because a qualifying competition is an important meet
.44	76) less likely, if there is still swelling
.39	124) more likely if this tournament was a peaking meet; if it was an important meet in the athlete's overall plan
.35	101) more likely, because at 15 she is getting near the end of her competitive career

Statements made more by other level coaches than by class III&IV coaches

.73	111) it does not matter whether she is average or best
.55	171) if the doctor said okay, then competing would depend on other factors
.49	127) depending on when this qualifying meet is, how important it is, whether it can be petitioned

Box 4.5.7b. Statements made by class III and IV in relation to the other competitive levels. The first column shows the relative differences in frequencies.

Statements made more by other level coaches than by national stream/high performance coaches

1.0	33) consult with the parents to see what they think about the situation
.74	52) delay the decision until the day of the competition, generally during the warm-up
.55	41) it is up to the athlete and/or her parents
.49	13) tape; support the foot well; do a good warm-up
.43	126) more likely, because a qualifying competition is an important meet
.38	76) less likely if there is still swelling
.33	14) pull her out of the competition if necessary; see how it goes

Statements made more by national stream/high performance coaches than by other level coaches

.79	51) decide earlier than the night before
.78	172) less likely, if the doctor said not okay, a high risk of reinjury
.75	171) if the doctor said okay, then competing would depend on other factors
.75	202) sustaining an injury to the opposite limb; sustaining another injury
.62	134) depending on what she can do
.62	161) unlikely, no, even though she wants to
.61	23) petitioning; medical bye
.61	45) the athlete has quite a bit of input in the decision; coach and athlete make the decision together
.61	123) more likely, there is not as much stress in a tournament; you can be more flexible
.52	132) more likely, if she can do her moves/routines/skills; if she did condition well; if she can land on it
.50	127) depending on when this qualifying meet is, how important it is, whether it can be petitioned
.43	71) less likely, there has not been enough time to recover; it has only been a week, 3 weeks
.37	111) it does not matter whether she is average or best
.36	31) obtaining medical advice through personal communication with a medical person

Statements made more by national stream/high performance coaches than by class I&II coaches

1.0	134) depending on what she can do
.86	172) less likely, if the doctor said not okay, a high risk of reinjury
.84	23) petitioning; medical bye
.73	171) if the doctor said okay, then competing would depend on other factors
.70	45) the athlete has quite a bit of input in the decision; coach and athlete make the decision together
.66	161) unlikely, no, even though she wants to
.59	123) more likely, there is not as much stress in a tournament; you can be more flexible
.59	132) more likely, if she can do her moves/routines/skills; if she did condition well; if she can land on it
.59	202) risk of sustaining an injury to the opposite limb; sustaining another injury
.54	116) less likely, you don't want to risk aggravating the injury with your Best athlete; you don't want to risk a Best athlete's future when she is young, or at an unimportant competition
.52	46) the athlete has some input
.51	71) less likely there has not been enough time to recover; it has only been a week, 3 weeks
.40	127) depending on when this qualifying meet is, how important it is, whether it can be petitioned
.37	31) obtaining medical advice through personal communication with a medical person

Statements made more by national stream/high performance coaches than by class III&IV coaches

1.0	51) decide earlier than the night before
1.0	202) risk of sustaining an injury to the opposite limb; sustaining another injury
.77	111) it does not matter whether she is average or best
.77	171) if the doctor said okay, then competing would depend on other factors
.69	172) less likely, if the doctor said not okay, a high risk of reinjury
.64	123) more likely, there is not as much stress in a tournament; you can be more flexible;
.64	127) depending on when this qualifying meet is, how important it is, whether it can be petitioned
.59	161) unlikely, no, even though she wants to
.51	45) the athlete has quite a bit of input in the decision; coach and athlete make the decision together
.44	132) more likely, if she can do her moves/routines/skills; if she did condition well; if she can land on it
.40	23) petitioning; medical bye
.34	31) obtaining medical advice through personal communication with a medical person
.34	71) less likely, there has not been enough time to recover; it has only been a week, 3 weeks
.33	203) doing permanent damage; chronic injury; hurting her for life

Box 4.5.7c. Statements made by national stream/high performance coaches in relation to statements made by lower level coaches. Relative differences in the first column.

cause the qualifying meet was important (126), which was more commonly done at the lower levels, particularly by class III and IV coaches. Furthermore, the elite level coaches were more likely to use the argument that a tournament provided the flexibility of competing only one or two events, and that tournaments were not as stressful. Also at this level, the decision would more likely be made in conjunction with the athlete; the coaches never mentioned that they would talk with the parents to see what they thought about the situation, whereas the coaches at the lower levels were more likely to mention that they would either consult with the parents, or completely leave the decision to them and/or the athlete. Competing with modifications like taping (13) or 'seeing how it goes' (14) were solutions found more frequently among the two lower level groups than among the national level coaches.

In comparison to both other groups, the coaches in class III and IV stated more often that a qualifying meet was important, and therefore, that competing was more likely (126). They also more frequently stated that competing in a tournament would be more likely if this meet was of special importance to the athlete (124). In addition, these coaches were more likely to believe that enough time had passed since the occurrence of the injury for sufficient healing to occur (81), and they mentioned more often that they would tape the ankle well and let the athlete compete (13). Furthermore, the coaches in class III and IV made more statements containing arguments in favour of a 15 year old competing (101, 102); they seemed to pay particular attention to the mental state and abilities of the athlete at the two different age levels, also stating more often that an 8 year old athlete would not have the psychological facilities to handle competing with an injury (92). The differences in statements between class III and IV and the other two groups seem to reflect the difference in numerical decision policies between these groups, with class III and IV ascribing the highest likelihood of competing to 15 year old athletes in qualifying meets, and the lowest to 8 year old athletes of average ability; the latter were often perceived as having less mental skills than best 8 year olds (the statement 'less likely, average athletes are psychologically less capable of handling competing with an injury' was also made more often by the coaches in class III and IV than by the other two groups, but this statement was not mentioned very often and had therefore not been included in the comparison). Not many coaches in class III and IV compared to coaches in the other two groups said that it did not matter whether the athlete was average or best (111).

There were only a few statements that were made more often by coaches in class I and II than by coaches in the two higher level groups. Class I and II coaches were more likely to say that they would be sensitive to the athlete's desire to compete, but that they would try to hold her back (164), and that they could make the decision, but that there was always the possibility that the parents wanted something different (43). This suggests that the coaches at this lowest level were least unique or distinctive in their comments in comparison to the other two groups.

Summary of Part V

The decision alternatives, modifications, managing strategies and considerations that were brought up by the coaches in their verbal responses to the scenarios were quantified by coding and counting them, so that they could be analysed in relation to (a) the parameter levels included in the scenarios, (b) cluster membership, and (c) competitive level coached. The statements that were made most frequently by all coaches were mostly directed at the four parameters varied in the scenarios, and tended to support the overall decision policies found in part IV, in particular, using more 'less likely' arguments for 8 year old athletes, athletes of average ability, invitational tournaments and severe injuries, and more 'more likely' arguments for 15 year old athletes, qualifying meets and moderate injuries. Other frequently mentioned statements involved modifications to the decision to compete full out, and the athlete's willingness to compete.

Of the four pairs of parameter levels, the comparison between the two levels of meet yielded the largest number of statements associated with either one of the two levels. Qualifying meets were generally perceived as important, and therefore competing would be considered more, particularly for best athletes, whereas invitational tournaments were generally perceived as unimportant, and therefore competing would be considered less, also particularly for best athletes. Competing in a qualifying meet would more likely be modified by taping the ankle, while competing in a tournament would more likely be modified by leaving out two or three events. The two levels of injury, moderate and severe, were distinguished by statements indicating different perceptions of the severity of the situation, statements interpreting the situation in a more favourable way being associated more with moderate injuries and statements commenting on the risks of aggravating the injury more with severe injuries. A tendency to delay the decision until the day of the competition, and to choose for competing with a taped ankle were found more often in association with a moderate injury. The two levels of age were separated predominantly by statements regarding the athlete's development, both psychologically and career wise. Competing was generally considered more for 15 year old athletes, because they were psychologically more mature and near the end of their competitive career, and less for 8 year old athletes for reverse reasons. Furthermore, the reasoning of the coaches in relation to the different levels of meet and ability seemed to vary with the age of the athlete. The two levels of ability were distinguished not only by statements indicating that competing in a qualifying meet was important for a best athlete and not worth the risk for an average athlete, but also by statements indicating the use of different sources of information for the two ability levels. When dealing with a best athlete, coaches would more often state that they would talk with the doctor to find out if the athlete could compete, when dealing with an average athlete, they would talk with the athlete herself, to see if she thought she could compete. In the latter case, they were also more likely to mention the level of pain experienced by the athlete as a criterion in their decision making.

In comparing the statements made by each of the two clusters it was found that cluster II made more statements than cluster I, a difference that was largely due to the greater number of statements regarding modifications made by cluster II. The statements made more frequently by cluster I revealed a relatively negative interpretation of the symptoms of the injury and a focus on the risks involved in competing. This cluster generally showed a more cautious attitude towards competing with the injury. The statements made more frequently by cluster II tended to be directed towards personal characteristics of the athlete such as her ability to compete injured, mental toughness, and her desire to compete, and to features of the competition, particularly the importance of this meet in relation to other competitions. Cluster II also made more statements interpreting the injury in a positive way.

A comparison of the statements made by coaches involved in different levels of competition revealed that the most distinguishing statements were those that separated coaches working with national stream/high performance gymnasts from coaches working with lower level gymnasts. The elite level coaches were more likely to state listening to the doctor's advice, and to personally communicate with the treating physician in order to find out more about the state of the injury and the risks involved in competing. They were also more likely to make the decision earlier than the night before the competition, whereas coaches at lower levels were more inclined to delay the decision until the day of the competition. In addition, the elite level coaches more often stated that there had not been enough time to recover, and mentioned the risk of sustaining an injury to the opposite limb. They seemed to perceive tournaments as less stressful meets than qualifying competitions, and used this as an argument in favour of competing in a tournament. In dealing with an important qualifying meet, they were more likely to ponder the relative importance of this meet in relation to other meets, and to consider petitioning, whereas coaches at lower levels, especially class III and IV coaches, were more likely to ascribe absolute importance to a qualifying competition, and consider competing merely because this meet was important.

Another difference between elite and lower level coaches was the involvement of parents in the decision process. Elite level coaches never mentioned that they would consult with the parents, whereas lower level coaches stated that they would. Lower level coaches, especially class I and II coaches, were more likely to indicate that the parents were more powerful, in that if they did not agree with the decision, they could always reverse it. Elite level coaches were more likely to give the athlete quite a bit of input into the decision or make a joint decision. Lower level coaches were more likely to leave the decision completely up to the athlete and/or her parents. The coaches in class I and II were least likely to give the athlete some input into the decision or talk with her to get her opinion on whether she thought she could compete.

CHAPTER V

SUMMARY AND DISCUSSION

In this chapter the findings of the study are summarized and discussed. A summary of the findings reported in chapter IV will be presented first, after which the results will be discussed from a theoretical and applied perspective.

SUMMARY

The purpose of this study was to gain insight into the strategies and considerations employed by coaches in their decision making about the participation of injured athletes in competition, and to acquire an understanding of the factors that influence these strategies and considerations. For this purpose, telephone interviews were conducted with 64 coaches of competitive female gymnasts in the province of Alberta. A questionnaire was administered, collecting quantitative as well as qualitative information about both coaches' decisions and their sociographic characteristics. The study employed a combination of a policy capturing approach and a qualitative approach in order to examine the cognitive aspects involved in the decision making. This was done by presenting the coaches with hypothetical scenarios and collecting both numerical and verbal responses to these scenarios. The scenarios depicted situations in which an athlete suffered an ankle injury prior to a competition, but was still eager to compete. The coaches were asked to indicate, on a 0-10 point rating scale, how likely it was that they would allow the athlete to take part in the competition. Four parameters, with two levels each, were systematically varied in a total of 16 scenarios, i.e. age (8 years versus 15 years) and ability level (average versus best) of the athlete, degree of the injury (moderate versus severe), and importance of the competition (an important qualifying meet versus an invitational tournament). 'Decision policies' were defined as the way in which coaches weighed these informational parameters in their choices, and were captured by a multi-linear polynomial mathematical model.

The verbal responses were analyzed qualitatively to detect strategies and considerations that coaches used in their decision making. A great number of considerations were found, many in the form of arguments supporting the decision, either in the direction of competing or in the direction of not competing. Furthermore, the coaches made statements about alternatives to competing, modifications to the manner in which the athlete would be competing if she was allowed to participate in the meet and strategies used to manage the decision process.

The decision policies and related verbal comments were analyzed from three different perspectives: (a) for the whole group of coaches (Table 5.1), (b) individual differences between coaches as determined by an internal grouping of the coaches on the basis of similarities in individual decision policies (Table 5.2), and (c) similarities and differences between coaches at different competitive levels (Table 5.3).

Results

Whole group

The aggregate decision policies revealed that in this study the coaches were generally more likely to consider letting the athlete compete if she was older and of higher ability, if the injury was moderate and the competition important. In addition, a significant four-way interaction effect indicated that the various combinations of parameter levels were evaluated in a unique way in the coaches' decisions. For both levels of age and for both levels of injury, the likelihood of competing was highest for the best athlete in a qualifying competition. The likelihood of competing was generally similar for average and best athletes if the competition was an invitational tournament. For situations involving a severe injury, the type of competition made a difference in the likelihood of competing, a qualifying meet being associated with a higher likelihood, a tournament with a lower likelihood. For situations involving a moderate injury, the type of competition made no difference in the likelihood of competing for a 15 year old athlete of average ability, but it did for a 15 year old who was one of the best (a higher likelihood for a qualifying competition than for an invitational tournament). For an 8 year old athlete of average ability, competing in a tournament was more likely than in a qualifying competition; for a best 8 year old the reverse was true. For most scenarios, the average likelihood of competing was on the unlikely side of the scale, except for the case of a best 15 year old athlete with a moderate injury going into a qualifying competition.

While the nature of the data did not permit the application of statistical tests, a general impression of the relative differences in the statements associated with each of the parameter levels was generated by comparing frequencies. The eventual impression was based on statements that were made at least one third more often in association with one level than in association with the other. These comparisons indicated that different types of arguments and strategies came into play when the parameter level changed. In particular, scenarios containing a moderate injury stimulated more statements indicating a delay of the decision until the day of the competition than scenarios containing a severe injury. With a moderate injury, coaches were also more likely to interpret the situation in a favourable way and to use the modification of taping the ankle when competing. With a severe injury, the coaches made more statements about risking aggravation of the injury, and about wanting to know the doctor's opinion. In addition, they made more comments suggesting that they would take the athlete

Table 5.1. Summary of the overall decision policies and statements for the whole group.

Ability	Age
Generally: Best > Average exceptions: AT = BT Sv8AQ = Sv8BQ *Best athletes*, more statements indicating: * competing more likely, - if meet important - at a tournament one can be more flexible * personally obtaining medical advice * competing less likely, because don't want to risk reinjury with a best athlete if young or meet not important *Average athletes*, more statements indicating: * competing less likely, because the athlete is of average ability and not likely to place * competing is less likely if it hurts, more likely if it does not hurt * consulting the athlete; athlete has some input	Generally: 15 > 8 *15 year olds*, more statements indicating: * competing more likely, - because she is more mature - because she is near the end of her career - if tournament was important for athlete * athlete has some or quite a bit of input, or decision is left to athlete *8 year olds*, more statements indicating: * competing less likely, because - she still has lots of time ahead - she is psychologically immature * competing more likely at a tournament because there is less stress, more flexibility * consulting parents * possibility of parents reversing decision
Injury	**Meet**
Generally: Mod > Sev exception: M8AQ = Sv8AQ *Moderate injury*, more statements indicating: * competing more likely, - because the injury is 'only moderate' - if she is very keen - if the meet is important - because it could be a competitive learning experience * taping the ankle * decide on day of competition *Severe injury*, more statements indicating: * competing less likely, because - the injury is 'severe' - the athlete has not trained on it enough * obtaining medical advice * the risk of making the injury worse * competing more likely if it does not hurt * taking athlete to the meet to watch	Generally: Qual > Tour exceptions: M8AQ < M8AT M15AQ = M15AT *Qualifier*, more statements indicating: * competing more likely, - because it is an important meet - a best athlete needs to compete in a qualifier - if the athlete is very keen - there has been enough time to recover * competing less likely, - if she is still limping - if she has not trained on it very much - because she won't be able to do her skills - there has not been enough time to recover * taping the ankle * petitioning * consulting the parents * talking with the athlete *Tournament*, more statements indicating: * competing less likely, because - a tournament is not important - don't want to risk reinjury with a best athlete * competing more likely, - if the tournament has special importance - because there is less stress, more flexibility - it may be a competitive learning experience * competing only one or two events * leaving the decision to athlete/parents

to the meet to watch. The two different age groups were also associated with different types of considerations. Both the stage of the athlete's competitive career and her level of cognitive and emotional development served as criteria distinguishing the coaches' reasoning with respect to the two age groups. Scenarios containing 8 year old athletes generated many statements indicating that the athlete still had lots of time to participate in competitions in the future, and that participating now was not worth the risk of aggravating the injury or causing permanent damage. With 15 year olds on the other hand, coaches were more likely to argue that the athlete was running out of time and that it might be one of her last chances to compete, because female gymnasts tend to be near the end of their competitive career at this age. It was often stated that 15 year olds were more mature than 8 year olds, therefore they could have more input into the decision. With 15 year old athletes the coaches would consult with the athlete herself, or even leave the decision totally up to her, whereas with 8 year old athletes they were more likely to indicate that they would consult with the parents. For the older athlete, the importance of the meet was also more likely to be considered as a criterion.

With regard to the athlete's ability level, the coaches appeared to use different sources of information as well as different criteria depending on whether they were dealing with an average or a best athlete. The strategy of talking with the athlete to assess her willingness and ability to compete was mentioned more if the decision concerned an average athlete, while the strategy of talking with medical professionals was mentioned more if the decision concerned a best athlete. An important criterion differentially affecting the likelihood of competing for average and best athletes seemed to be the possibility of achievement. Many statements were made indicating that it was not worth taking a risk competing an average athlete at a qualifying meet if she did not have a chance of making the team, but that it was important to compete a better athlete who did have that chance. In dealing with an average level athlete the coaches used the presence of pain as a criterion more often than with a best level athlete. The two types of meet also generated different types of considerations and strategies. Qualifying competitions were generally deemed to be important, especially for best level athletes, so the coaches would put more considerations into the decision process to see if the athlete could be allowed to compete. The managing strategies that were used in dealing with the decision in the situation of a qualifying meet also indicated that more went into this decision, e.g. talking with the athlete, consulting the parents, etc. The solution to modify competing by taping the ankle well would more often be chosen for a qualifying meet, and a favourable interpretation of the healing time was also associated solely with a qualifying meet. Invitational tournaments were generally deemed to be unimportant, which made it simpler to decide, as was evident in the smaller number of statements associated with tournament scenarios in comparison to qualifying meet scenarios. Avoiding aggravation of the injury seemed to be considered particularly necessary for a best athlete, unless the meet was important in the athlete's overall plan; oftentimes a tournament's flexible nature was used as a reason to opt for competing only one or two events.

The verbal responses to the scenarios also suggested that the decisions may depend on other factors than the four situational characteristics contained in the scenarios, for example, the athlete's personality, her performance level with the injury or the type of experience that she is likely to have. However, the relationship of these factors to the decision outcome was not systematically examined in this study.

The quantitative and qualitative analysis of the scenario data at the aggregate level suggests that the likelihood of competing with an injury tends to be on the lower side of the scale, but that there are definite differences in the extent that competing is considered depending on the four situational characteristics presented in the scenarios (and possibly other factors as well). The more important the competition and the better and older the athlete, the more likely it is that she will end up competing.

Inter-individual differences

On the basis of their individual decision policies, a cluster analysis grouped the coaches into two clusters with more or less homogeneous policies, which were distinguished by the weights assigned to the intercept, the injury factor and the injury-meet interaction. The coaches in the first cluster were generally quite unwilling to let an injured athlete participate in a competition. Although these coaches did seem to pay attention to the different levels of the four parameters, neither of these parameters or any combination of them was able to lift the decision to the point where competing would be likely. These coaches seemed to operate from the perspective: "There is an injury, so the likelihood of competing is very low. Yes, I might consider it more when the competition is really important and it concerns my best athlete, or when the athlete is 15 rather than 8 years old, but it would still be quite unlikely that she would compete". The degree of damage present at the level of the moderate injury appeared to be interpreted as sufficiently severe to keep the athlete from competing. The decisions of the coaches in the second cluster were particularly influenced by the degree of severity of the injury and the importance of the meet. If the injury was severe, they considered competing unlikely in most situations, except in the case of a 15 year old best athlete and an important qualifying competition. If the injury was moderate, they considered competing likely in most situations, except in the case of an 8 year old athlete of average ability in an important qualifying competition. With this injury, competing was even considered very likely if the athlete was one of the best, regardless of her age. Overall, the coaches in the second cluster were more inclined to allow the injured athlete to participate in a competition, and they appeared to interpret the degree of damage of the moderate injury as relatively minor, or at least not as a reason to keep the athlete from competing.

The verbal statements accompanying their numerical answers reflected the differences between

Table 5.2. Summary of the decision policies and statements for the two clusters.

Cluster I	Cluster II
n = 32	n = 30
Decision policy: * mean constant: 1.80 * injury effect: Mod: 2.29 Sev: 1.32 * injury-meet interaction: MT: 1.70 SvT: 0.80 MQ: 2.88 SvQ: 1.84 * highest significant interaction: two-way * relatively less complicated	*Decision policy*: * mean constant: 5.01 * injury effect: Mod: 6.20 Sev : 3.83 * injury-meet interaction: MT: 6.02 SvT: 3.01 MQ: 6.38 SvQ: 4.64 * highest significant interaction: four-way * relatively more complicated
Injury history: * more likely to: - have had first ankle injury after the age of 15 - have missed a meet because of an injury after the age of 15 - have had a bad experience competing injured - know an athlete who experienced negative consequences as a result of competing injured	*Injury history*: * more likely to: - have had first ankle injury before the age of 15 - have missed a meet because of an injury before the age of 15 - have had a good or a neutral experience competing injured - still be affected by an injury * less likely to know an athlete who experienced negative consequences as a result of competing injured
Injury education: * more likely to have attended quite a few injury clinics, or not to have attended any injury clinics at all	*Injury education*: * more likely to have attended one or a couple of injury clinics or workshops
Statements: - less statements in total - less "more likely" statements - less positive injury statements - less statements regarding meet - more statements interpreting the injury in a negative way - more statements regarding risks involved	*Statements*: - more statements in total - more "more likely" statements - more positive injury statements - more statements regarding meet - more statements involving timing and importance of the meet - more statements regarding modifications to competing - more statements indicating that the athlete's keenness made a difference - more statements regarding learning experience - more likely to leave decision to athlete/parents

the two clusters. The higher likelihood of competing and the more complex decision policies of the coaches in cluster II were accompanied by a greater number of statements than the lower likelihood of competing and the 'simpler' decision policies of the coaches in cluster I, particularly statements concerning modifications to the way in which the athlete would compete. This is understandable as there is no need to use modifications if one decides that the athlete won't compete. Furthermore, the statements that were made more often by the coaches in cluster I generally conveyed a cautious attitude towards letting the injured athlete compete, and a focus on the negative symptoms and risks of the injury. The coaches in cluster II made more statements regarding personal characteristics of the athlete, the athlete's desire to compete as well as features of the competition. This suggests that the coaches in cluster II did not totally neglect the injury in allowing the athlete to compete, but showed concern about reducing the stress on the injury, although not to the point of leaving the athlete out of the competition. It seems that their lesser sensitivity to the impact of the athlete's injury and to the risks involved in competing injured, made them more open to value influences from other sources, particularly the athlete's personal make-up, and values imposed by the structure of competitive sports, as expressed in the relative importance of competitions.

The difference between the two clusters was not significantly related to demographic variables like gender or age of the coach, nor with years of coaching experience, level of certification in the NCCP program, competitive level coached now or in the past, or with the degree of education in injury care and management received, but it was related to some variables indicative of coaches' injury history. The coaches in cluster I were more likely to have had a bad experience competing injured, either personally or vicariously; the latter by personally knowing an athlete who had experienced negative consequences as a result of competing with an injury. The coaches in cluster II were less likely to have had such negative experiences. If they had competed with an injury themselves, this had more likely been a neutral or positive experience for them, and if they knew someone who had experienced negative consequences as a result of competing injured they were less likely to know this athlete personally. The two clusters also differed significantly in the age at which some injury-related events took place in their lives. The coaches in cluster I were more likely to have experienced their first ankle injury after the age of 15, and to have missed an important competition because of an injury after the age of 15, while the coaches in cluster II were more likely to have had such experiences before the age of 15, and to still somehow suffer from a past injury.

All in all, the differences in decision policies between the two clusters were predominantly related to differences in coaches' personal experiences with injuries, and particularly injuries in relation to competition.

Differences between competitive levels

A comparison between the policies of coaches at lower (class I and II), intermediate (class III and IV) and elite (national stream and high performance) levels of competition revealed that the coaches at these three different levels did not differ in the way they evaluated injury, but they did in the way they treated the athlete's age and ability and the importance of the meet. Coaches at intermediate levels differentiated most between the levels of these parameters and showed the largest spread in their answers, indicating that of all three groups they were most sensitive to differences in the age and ability

Table 5.3. Summary of the decision policies and statements for different competitive levels.

Class I & II	Class III & IV	Elite
n = 25 *Decision policy*: * most likely: 15BQ : 5.56 8BQ : 4.3 * least likely: 8AT = 8BT = 8AQ = 15AT = 15BT = 15AQ : 3.7 * intermediate spread in likelihood scores *Statements*: * least distinguishing in number of statements made mostly by this group * more likely to delay decision until day of competition * more statements indicating: - the parents can reverse the decision	n = 20 *Decision policy*: * most likely: 15BQ : 6.08 15AQ : 4.4 8BQ : 4.18 * least likely: 8AT = 8BT = 8AQ : 1.9 * greatest spread in likelihood scores * most sensitive to differences in age, ability and meet *Statements*: * more likely to delay decision until day of competition * more statements indicating: - competing is likely because a qualifier is important - parents will be consulted - competing with modifications like taping and 'seeing how it goes' - competing in a tournament is more likely if it is of importance to athlete - sufficient time has passed for the injury to heal - a 15 year old is more likely to compete because she is more mature and at the end of her career	n = 13 *Decision policy*: * most likely: 15BQ : 3.81 * least likely: 8AT = 8BT = 8AQ = 8BQ = 15AT = 15AQ = 15BT : 2.6 * smallest spread in likelihood scores * lower likelihood for qualifying meets than class I - IV *Statements*: * most distinguishing in the number of statements made mostly by this group * more likely to make the decision earlier in the week * more statements indicating: - doctor's advice is important - personally consulting with the doctor or physiotherapist - a risk of injuring the opposite limb - healing time has been insufficient - petitioning - decision depends on the importance of the meet - tournaments provide the opportunity to be flexible - decision is made together with the athlete

level of the athlete and the importance of the competition. Coaches of elite levels differentiated least between the levels of these parameters and showed the smallest spread in their answers, indicating that for them, these factors had a less dramatically different effect on the likelihood of competing. In fact, these coaches assigned an equally low likelihood score to all combinations of age, ability and meet, except for one, the situation of a 15 year old best athlete going into a qualifying competition. Yet, this likelihood was still significantly lower than for the two other groups. Generally, the coaches at the two lower levels were more likely than the elite level coaches to allow an athlete to compete in a qualifying meet, and they were particularly inclined to let a best athlete compete in such a meet, regardless of her age. When dealing with an average athlete or a tournament on the other hand, they tended to withhold the athlete from competing.

The verbal statements once more reflected the differences between the three groups of competitive levels, with the differences between elite level coaches on one hand and the lower level coaches on the other hand again being clearest. The lower likelihood scores of the elite coaches regarding qualifying meets were accompanied by more statements evaluating the relative importance of the meet in relation to other meets. The elite coaches were also more likely to try and petition the athlete on to the team. In addition, they made more statements indicating that an invitational tournament provided the opportunity to be flexible and work with less stress. Such considerations may explain the relative absence of a distinction between qualifying meets and invitational tournaments in the policies of these coaches, and their tendency to perhaps allow competing in a tournament before competing in a qualifying meet. The higher value placed on competing in qualifying meets in the policies of the coaches at the non-elite levels was accompanied, particularly for the intermediate level coaches, by more statements arguing that competing was more likely simply because the meet was important. Other differences between the groups concerned the managing strategies used. The elite level coaches were more likely to make the decision earlier than the night before the competition, the non-elite level coaches later. The groups also tended to seek different sources of information. Elite level coaches never indicated that they would consult with the parents, but instead mentioned more often that they would personally communicate with a physician. They would give the athlete quite a bit of input in the decision however. The non-elite level coaches were more likely to seek the parents' opinion, but also to leave the decision completely to the athlete and her parents, something the elite level coaches were less likely to do.

These differences suggest that coaches at different competitive levels do indeed make their decisions differently, with the difference between the elite and the non-elite levels being the most unequivocal.

DISCUSSION

Cognitive (decision) theories

Primarily, this study focused on the cognitive aspects involved in coaches' decision making about the participation of injured athletes in competition. Since cognitions can not be observed directly, inferential methods had to be used to study the cognitive processes involved in this decision. This was done from two different perspectives. The policy-capturing approach provided a mathematical model indicating how the informational input was related to the decisional output, and in this way helped to shed some light on the way in which the information was evaluated and integrated. The other perspective was provided by interpreting the verbal comments that accompanied the coaches' decisional choices, generally consisting of descriptions of what they would do and arguments as to why they made their decision the way they did. The method used to analyze the verbal data probably comes closest to the type of qualitative analysis classified by Tesch (1990) as 'the discovery of regularities', in particular as a 'discerning of patterns'. The question is how this verbal information can be interpreted.

Verbal information

With respect to the use of verbal self-reports in decision-making or problem-solving studies, the discussion in the last decade has centred around two influential articles posing opposite views, one by Nisbett and Wilson (1977), the other by Ericsson and Simon (1980). The authors of the first article (Nisbett & Wilson, 1977) argued against the use of self-report measures. After reviewing a considerable number of studies they concluded that, in general, people are not capable of reporting accurately on the effects of stimuli on the responses that they gave, and therefore self-reports should not be used to infer higher order cognitive processes used in evaluation, judgment or problem-solving tasks. They suggested that when people are asked why or how they made a particular decision their answers are based on a pool of beliefs about how certain available cues are linked to the response that they gave, not on the memory of the actual factors that influenced their decisions. Although they did admit that people sometimes do report accurately on these processes, they suggested that this is only possible if the actual influential stimuli are both available to the problem solver and perceived as plausible causes of the responses (while at the same time there are few or no plausible but non-influential factors available), or if there are clearly specified rules within the culture or sub-culture regarding the causal relationship between stimulus and response.

The authors of the second article (Ericsson & Simon, 1980) on the other hand, relying on a model regarding the structure of memory, proposed that verbal reports can be used to study the information processing of people during problem-solving and decision tasks, as long as the information is collected during the execution of the task, or possibly very close in time to the performance of the task; accordingly, they created the 'thinking aloud' method to study the conscious information processing going on in short term memory while people are reasoning or deliberating about a problem. This method has been used quite extensively by researchers interested in the information-processing aspects of problem solving and decision making (Ford et al., 1989). However, although this method was presented as a way to circumvent the problems demonstrated by Nisbett and Wilson, it is plausible that if there really are higher order processes going on that affect judgments and decisions at a subconscious level (e.g. cognitive dissonance, subliminal perception or the effect of external factors, as used by Nisbett and Wilson to support their argument), they will likely not be processed in short term memory. Therefore, they will not occur in protocols of thinking aloud studies either. Information on the role of such factors can only be ascertained from an outside perspective by using experimental designs and/or statistical inferences based on a large number of decision situations.

Recently, a third perspective on the use of verbal reports concerning decision-making processes was presented by Montgomery (1989a; 1989b), when proposing his 'search for dominance' theory. Although this theory was mostly based on thinking-aloud laboratory designs, Montgomery argued that justifications provided after a choice has been made can yield useful information regarding the decision process, because they can be interpreted as representing the cognitive structure ('dominance structure') that allowed the final choice to become the dominant alternative over the non-chosen options. While not contributing to an understanding of the information search and integration processes occurring during decision making, nor supplying information about processes that subconsciously affect the relationship between input and decision outcome, they do reflect some important aspects of the decision process. Montgomery saw the decision-making process as an attempt to create a cognitive structure that represents the problem in such a way that it can easily be seen which alternative is the best. Such a structure contains suitable beliefs that can serve to justify the final choice made. Whereas Nisbett and Wilson (1977) suggested that justifications are not necessarily related to the actual cognitive processes involved and can only be seen as causal theories about the relationship believed to exist between input stimuli and decisional output, Montgomery's 'search for dominance' theory implies that those causal theories do play an important role in the process of decision making, because they are used to build cognitive structures around possible alternatives and to 'test' hypotheses about the tenability of a promising alternative. Montgomery opted to use the term 'causal schema' to refer to people's conceptions about the structure of causal relations within a given domain. Existing causal schemas may be used in decision making to generate arguments that help support the choice of a certain alternative. It is conceivable that the higher order processes that Nisbett and Wilson referred to have their effects on decision making by influencing, for example, which situational factors are attended to, the type of causal schemas adopted or the way in which relevant schemas were built through past experiences, etc.

Where does this leave the verbal information collected in this study? The statements made by the coaches in response to the scenarios were not real 'thinking aloud' protocols. Although some coaches appeared to actually be thinking out loud while they were making their decision, others were merely justifying their decisions after they had indicated the likelihood score. Some of the information therefore may be representative of what was actually processed by the coaches while they were thinking about how to respond to the scenario, but for most coaches the verbal comments probably should be interpreted as reflecting the dominance structure that supported their decision. The verbal information can not be used to infer higher order cognitive processes, regarding how exactly the coaches used the parameters in the scenarios (the decision policies provided this type of information), but it does give an indication about the beliefs and values that the coaches held in relation to the parameters in the scenarios and to other factors involved in this situation. In addition, this information provides insight into the factors that the coaches believed they would take into account if they were dealing with a similar situation in their real life. As the coaches were asked to imagine what they would do if a situation like the one presented would arise, they were likely constructing a representation of the problem that relied partly on their memory of how they had made such decisions in the past - if such experiences were available -, and partly on their beliefs of which options were available to them, and what they considered important (values). All of these beliefs and values were likely part of the dominance structure that supported their choices.

Decision rules

A major interest in decision-making research centres around the nature of the cognitive strategies that people use in making a judgment or coming to a decision, that is, the way in which individuals use information in the act of deciding.

In this study it was found that, at the aggregate level, the coaches used each of the four parameters and made trade-offs between the different parameter levels, for example, with a severe injury the likelihood of competing would go down, but if the athlete was older and better and the competition important, the likelihood would come up again. This suggests a compensatory strategy.

However, the verbal comments and the clustering suggest that at the individual level the coaches also used simplifying non-compensatory strategies. An often used strategy for example appeared to be the elimination-by-aspects rule. This rule, a combination of the conjunctive and lexicographic rules (Svenson, 1979), consists of ordering the parameters according to importance, after which the most important parameter is examined first to see if it exceeds a predetermined criterion. Alternatives that do not pass the criterion for this attribute are no longer considered. The coaches in cluster I seemed to use such a strategy, examining the injury first and finding it below the cut-off point for competing. Their cut-off point was set low enough that even the moderate injury did not exceed the criterion. Comments like "We don't compete 8 year olds regardless of whether they are injured" or "It is only an invitational, it is not worth it" also suggest an elimination-by-aspects rule, using age and meet as most important parameters respectively.

Use of the elimination-by-aspects strategy seems most simple in the present decision situation if examination of the first parameter leads to the decision not to compete. If the first parameter that is considered falls above the cut-off point (as was the case, for example, for the coaches in cluster II with regard to the moderate injury), there seem to be various options. (1) The coach may make a decision solely based on this finding, however, this strategy did not appear very often. The only coach who appeared to use this strategy was the one who gave sevens to all scenarios. Her comments suggested that she thought that both the moderate and the severe injury had had enough time to heal in either case, and that the ability and age of the athlete or the type of meet made no difference in her decision making. (2) The coach can continue with the elimination-by-aspects strategy by considering the cut-off point for the next parameter, for example, looking at the age of the athlete and finding it too young to compete with an injury. (3) The coach may further use a compensatory weighted additive strategy, weighing the levels of the remaining parameters against each other. The coaches in cluster II may have used this combination of elimination-by-aspects and weighted additive rules. This combination comes close to the use of a full compensatory strategy.

Coaches may use different decision rules for different scenarios. The greater effort extended in situations where competing is considered important suggests that compensatory strategies are more likely to be used in those situations. This is in line with Payne, Bettman and Johnson's (1988) finding that decision makers select strategies on the basis of the expected costs and benefits of each strategy.

Managing strategies

Because decision-making processes and information search strategies have been studied predominantly in laboratory studies, not much is known of how decision makers go about the process of managing a decision in real life situations. The strategies that the coaches in this study employed to manage the decision process appeared to serve several purposes, including (a) finding out more information to help construct an idea of the risks involved, (b) allowing time for more healing to take place so that the athlete's prospects of competing increased, (c) lessening the responsibility by sharing or delegating it, and (d) collecting arguments to back up the eventual decision made, which may increase confidence in the appropriateness of the decision. Their actions in the managing process confirm Rogoff's (1984) claim that decision making in everyday life contains a strong social component that tends to be absent in laboratory studies. In their search for information the coaches had to rely to a great extent on the opinion of others (athlete's accounts of pain and willingness to compete, physicians' reports, parents' wishes), which suggests that the quality of communication channels and the factors that determine the credibility of a source become relevant variables to investigate in real life decision making. In this study the pertinence of the advice given by general practitioners for instance was often questioned, leading coaches to search for more useful information or to rely more on their own judgments.

In terms of decision theories, the use of managing strategies appears to fit roughly with Montgomery's 'search for dominance theory' (1989a; 1989b), although Montgomery only addressed the internal search processes within the decision maker's knowledge structures without mentioning the possibility of an active search for new information or attempts to share responsibility. Yet, it seems possible to construe what the coaches are doing as attempts to find ways of altering the representation of the problem situation until one alternative becomes dominant, that is, until the coach feels that there is enough justification to either not allow the athlete to compete, or to let her compete, with or without modifications. The coaches appear to be building mental structures of 'knowledge' around the various alternatives, on the basis of both the information that they collect and their existing values and beliefs. In laboratory studies (Montgomery & Svenson, 1989; Tyszka, 1989) there have been some indications that the search for information is affected by the pre-selection of one or a couple of 'promising alternatives' early in the decision-making process, and that there is a reluctance to give up an initially attractive alternative if a dominance structure can not be found. One may wonder if such processes also affect the more extended managing strategies used by coaches with respect to the current decision. It is difficult to conceive what a 'promising' alternative early on in the process would look like in the present decision. It may be more appropriate to speak of 'probable' or 'desired' alternatives, which may be two altogether different options. It is quite possible that if probable and desired alternatives are perceived to be different (e.g. in the case of a severe injury to a best athlete with an important meet coming up), the managing strategies are influenced in the direction of trying to increase the probability of the desired alternative (e.g. by delaying the decision to the last moment, or seeking information that will support the desired alternative). It also seems plausible that during an extended decision process the decision maker will keep alternating between promising, likely or desired options, or keeps devising new options or modifications to existing options, for which then new cognitive structures are built.

Personal history

Personal experiences may be expected to affect decision outcomes by shaping individuals' knowledge bases. Commonalities in the knowledge bases of different individuals may result from having undergone similar experiences. In research, such commonalities are often implicitly assumed to exist among persons who share the same category of a background variable. In this study, the main background variables related to differences in cluster membership were bad experiences, or lack thereof, with competing injured. Contrary to what might be expected, the degree of injury education, and consequently the inferred level of knowledge regarding care and management of injuries, was not significantly related to cluster membership.

Injury education

That the extent of injury education was not related to cluster membership, and had a fairly small effect size, suggests that the amount of exposure to educational information regarding injury care and management does not make coaches more or less cautious in dealing with injured athletes. There may be several explanations for this finding. First of all, the variable used here was a rather crude measure; injury education was measured by asking an open-ended question regarding which courses or workshops the coaches had taken in injury care and management; on the basis of this information, the researcher classified the coaches into 4 categories ranging from very low to high levels of injury education. A more precise measure of this factor might lead to different results. Secondly, one needs to consider that the amount of exposure to injury education may not say anything about the content or the quality of this education. A case in point is the finding that the coaches in cluster I were more likely to have taken either no clinics or workshops in injury care and management or quite a few or many of them, while the coaches in cluster II were more likely to have taken one or a couple of these organized sessions. This suggests that once coaches have taken one or a few of these workshops or clinics, they are more likely to consider competing an athlete (with a moderate injury), whereas, by the time they have taken quite a few or many of these clinics, they may become more cautious. How these workshops or clinics might alter coaches' perceptions and decisions is an interesting question. It is possible that workshops and clinics tend to teach taping techniques, which may reinforce the belief that the athlete can compete on the injured body part.

Therefore, it would seem useful to include more specific measurements of injury education in future studies, and to attempt to evaluate the content of the educational experiences.

Injury history

The finding that cluster membership seems to be related primarily to the types of experiences that coaches have had with injuries and with competing while injured points to the prominence of one of Tversky and Kahneman's (Kahneman, Slovic & Tversky, 1982) decision heuristics: the "availability heuristic". According to this principle, people's decisions are directed by salient or recent experiences that are easily available in memory. The availability heuristic is generally taken to mean that if an event can be more easily imagined or recalled, judgements about the probability of its occurrence are higher or overestimated (Eiser & van de Pligt, 1988). Abelson and Levi (1985, cited in Eiser & van de Pligt, 1988) suggested that the rehearsal of relevant event scenarios may enhance the availability of that specific scenario, which implies that having experienced a certain scenario increases the availability of that scenario; this could explain the relationship between an injury history including first or second hand bad experiences with competing injured and the lower likelihood of competing for the coaches in the first cluster. However, it does not mean that the original memory was necessarily consciously present in the coach's mind when deciding about the injured athlete's participation; very few coaches referred to their own experience, or used their own experience in justifying the reasons for their decision. Although this is no proof that they were indeed not aware of these experiences while they made their decisions, it strongly suggests that these experiences can affect decisions without being a conscious deliberation. This implies that 'availability' does not necessarily mean that the event is actually imagined when the judgment or decision is being made, but it appears to affect the construction of the problem situation and the judgments of the risks involved. However, a genuine 'thinking aloud' study is needed to see to what extent previous experiences enter the mind of the decision maker during the decision-making process.

The fact that having missed an important competition because of an injury and the emotional impact of this experience did not significantly differentiate between the two clusters, but the age at which this happened did, may indicate that particular injury related experiences that occur before the person has reached a certain level of maturity do not become part of the knowledge structures that guide the decision, whereas if they occur after a certain age they do become part of these relevant knowledge structures. Why this happens one can only speculate. Possibly, the experience becomes inaccessible because of the time lag or the way in which information is stored at an earlier age, or the event is experienced in a different way at a younger age. Having gone through this experience after one has reached a certain level of maturity apparently instills in the mind a degree of cautiousness with regard to competing with an injury that does not occur when such an event is experienced at an earlier age. A similar explanation may be applicable to the relationship between the age of the first ankle injury and cluster membership. It is possible that the early ankle injury (10 coaches had the injury below the age of 10) was too far back in time to become a salient memory that would influence coaches' decision making regarding their athletes, or that it was a less memorable experience, possibly because at that age the injury might have healed faster.

It is interesting, and contrary to what one would expect, that the coaches in cluster II were more likely to still suffer from after-effects of a previous injury (some as far back as 15 or 20 years). One may wonder if somehow a cognitive dissonance effect is responsible for this relationship. Still being affected by a past injury may influence the coaches' judgment of the risks involved by lowering or de-emphasizing the severity of the consequences, i.e. interpreting it as that living with discomfort is not that bad. Another possibility may be that this finding is reflective of a life-style in which the risks associated with injuries are generally under-estimated or down-played, perhaps because of a 'tougher' attitude. These are speculative interpretations, and further study is definitely needed to clarify this relationship.

Mental representation of the decision problem

In discussing the mental representation of the decision problem, it seems useful to make a distinction between judgments of physical risks involved in participating (the probability as well as the extent of further damage) and the values that coaches hold in terms of which outcomes are important in combination with probability judgments of these outcomes occurring. The decision policies and the comments provided in response to the scenarios suggest that both these factors are present and have distinct effects on the decision outcome, although they may at times interact. It seems important to be aware of the distinction between these two components because both may be sensitive to separate influences. Interventions aimed at trying to change one or the other would require different approaches. It may be easier to change 'factual knowledge' (beliefs about risks) than value structures. Although risk judgments and values were not directly measured in this study, the data provide enough indirect information to discuss their relevance in this framework.

Risk judgments

Judgments of the physical risks involved in competing with the injury have to be related to the coaches' interpretation of the symptoms of the injury. It was no surprise to find a main effect for injury in the coaches' decision policies, implying that the coaches as a group estimated the risk of doing further damage to be higher with a severe injury than with a moderate injury. However, inter-individual differences existed between the coaches in their judgments of the risks associated with moderate injuries, differences that could be retraced in particular to their personal injury history. Furthermore, the risk judgments seemed to be influenced by coaches' existing beliefs about the unique effects of athlete characteristics and situational factors on the chances of incurring an injury.

Athlete characteristics

A variety of beliefs regarding the effect of certain individual characteristics of the athlete on the risks involved in competing appeared in the coaches' responses. Specifically, the risk judgments seemed to be effected by beliefs involving (a) speed of healing, (b) mental skills, (c) physical build, and (d) maturity level. With regard to the athlete's speed of healing, which was sometimes considered to be faster for younger athletes, the risks were believed to be lower for athletes who heal faster, because the repair of the tissue should have progressed further. Evidence can be found that athletes do vary in their speed of healing (Ievleva & Orlick, 1991), and a general impression seems to exist that younger children are fast healers (Lahey, 1993), although it is hard to find empirical evidence in the medical literature that this is indeed the case. Differences in speed of healing imply that an individual approach to the situation is warranted, and the comments of many coaches suggest that they did indeed use an individual approach. However, some coaches seemed to base their impression of the state of healing on the assumption that the injury would probably be healed because the athlete is younger. This would appear to be a dangerous assumption. Proper assessment of the state of the injury is always needed. Even if younger children do indeed heal faster from injuries, the injury still should be completely healed, and muscle balance restored, before the athlete can compete on it, otherwise the athlete will likely compensate for the injury and risk reinjury or injury to the opposite leg (Landry & Gomez, 1991;

Micheli, 1984).

Risk judgments also appeared to be affected by beliefs regarding the athlete's mental skills, in particular her capacity to concentrate and 'keep a clear head' during competition. For athletes who lacked this capacity, ascribed especially to younger and sometimes to average level athletes, the risk was assumed to be higher because these athletes might do something unpredictable and injure themselves further. Recent research suggests that there may be some grounds for this belief. Evidence is starting to appear indicating that reduced mental abilities, such as slow reaction time, poor control of emotions or low I.Q., do indeed increase the risk of accidental injuries (Taimela, 1992). Besides beliefs about the athlete's mental skills, beliefs regarding her physical build were also occasionally linked to risk judgments. Lighter and smaller athletes (often equated with the younger and/or the better ones) were thought to run less risks than heavier and taller athletes (often equated with the older and/or average ones). This perceived relationship can be substantiated somewhat by the findings of a study by Steele and White (1986), who concluded that female gymnasts with a higher risk of injury were heavier, of shorter stature and of poorer musculature than those with a lower injury risk.

The athlete's maturity level was indirectly related to risk judgments, by affecting beliefs about the reliability of the information provided by athletes of different ages. Coaches generally felt more confident in the information that a 15 year old could give them about the state of the injury and its effect on her ability to perform than in the information provided by an 8 year old. They were more likely to interpret a 15 year old's declaration that she *wanted* to compete as an indication that she also thought she could compete, and they were more willing to trust her judgment because of her maturity level and the fact that she had trained for years and should know her body well. Coaches who made these inferences then seemed to use this information to establish an internal representation of the situation in which the state of the injury would permit competing. While such faith in the athlete's own judgment may seem justifiable, there is evidence that highly motivated athletes have a tendency to return to competition too soon, with a definite increased risk of reinjury (Wroble et al., 1986). This suggests that athlete's self-reports about their ability to compete should perhaps not so readily be trusted. More studies are needed to investigate under what circumstances athletes' self-reports are more likely to be accurate, and when not.

Only a small number of coaches explicitly mentioned the risk of growth plate injuries for 8 year olds. This, however, is an important factor to take into account, because damage to growth plates may result in growth deficiencies (Caine, 1990; Micheli, 1989).

Situational characteristics

Characteristics associated with the type of meet also seemed to have differential effects on the judgment of risk. In particular, coaches perceived tournaments to be less risky, because there was less pressure to perform really well, and more opportunity to be flexible and just compete in the events that place least stress on the injured ankle. The difficulty of the skills at the various competitive levels was also occasionally mentioned as a consideration, with higher skill levels being perceived as involving a higher risk, and lower skill levels involving lower risks. This belief corresponds with findings that the risk of injury is higher at higher performance levels (McAuley et al., 1987).

Nature of risk judgments

For most of the beliefs that affected the perceived risk involved in competing, some evidence can be found in the literature that supports the relationship that coaches believed to exist between athlete or situational characteristics and injury risk, which means there is a certain amount of truth to these beliefs. In the medical literature, many factors have been found to influence the likelihood of an injury occurring in gymnastics (McAuley et al., 1987; Meeusen & Borms, 1992). The presence or absence of certain risk factors may indeed raise or lower the risk in a given situation. However, the actual level of risk with any combination of factors can not be determined. It is impossible for anyone to make an accurate judgment of the actual risk involved in the situation, and it is probably not important to determine the actual risk. What is important is to determine the critical level; unfortunately, this can not be accurately assessed either. To stay on the safe side, therefore, it is generally recommended not to put full-out stress on an injured body part until it is completely healed. There are indications in this study, however, that coaches sometimes use these beliefs to infer that the risks are low, and consequently not a concern in the decision. Future studies need to examine more specifically to what extent risk judgments are affected by single beliefs of the sort mentioned above.

To a certain extent, the comments about risks made in this study may have been an artifact of the design of the study. Some of the comments, for example that the risk would be lower in a tournament than in a qualifying meet, may have been invited by the explicit comparison of qualifying and invitational competitions, or younger and older athletes. Such comparative statements would probably not be present in the coaches' deliberations and judgments about risks in real life situations. Nevertheless, it remains plausible that athlete dispositions and situational characteristics are part of the considerations involved in real life decisions as well, and do differentially affect the risks believed to exist in a given situation.

Values

In addition to the judgment of the seriousness of the injury and the degree of physical risk involved in competing on it, the coaches' decisions were determined by values used in the evaluation of how worthwhile it was for this athlete to compete under these circumstances. If the risk perception was such that no major risks were seen to exist, the decision seemed to be determined predominantly by the coach's values. Strean (1993), who studied coaches' values as part of their coaching ideology identified five broad areas of values relevant to youth sport coaches, namely (a) reaching positive biopsychosocial outcomes for the athletes (e.g. enjoyment, pride, activity, fitness, fun), (b) reproducing status quo ideals (e.g. discipline, character development, respect), (c) performance enhancement (e.g. excellence, commitment, skill development, winning), (d) affiliation (e.g. friendship, team spirit, social development) and (e) sociopolitical perspectives (e.g. democracy, power, equity). In this study, most of the values that seemed to co-determine the coaches' decisions regarding an injured athlete's participation in competition fell into the first and the third area. The value that surfaced most frequently in the coaches' responses was the possibility for achievement. Other values that steered the decisions, mostly towards competing, were the opportunity for the athlete to have a learning experience, the possibility for fun and social contact, and the wish to make the athlete happy by giving in to her desire to compete.

Achievement

It was clear that the possibility of achievement, whether in the form of making the team or giving the athlete a sense of accomplishment, was intensely and intricately related to the coaches' decisions. Achievement may be measured according to either absolute or relative standards, the absolute standard equating achievement with success in terms of competitive ranking, the relative standard defining success as reaching a personal goal, independent of competitive placements. Both types of standards were implicitly used in the coaches' justifications for their decisions, although the absolute standard seemed to dominate. The prominence of absolute standards was quite clear, for example, in the indications that invitational tournaments were not important, while qualifying meets were. The greater importance and prestige assigned to a qualifying meet was also reflected in the managing strategies used. More effort was expended in making the decision in the situation of a qualifying meet than if the meet was a tournament, e.g. talking with the athlete, consulting the parents, etc. Deciding (not to compete) was simpler in the case of 'unimportant' invitational tournaments, as was evident in the smaller number of statements associated with tournament scenarios in comparison to qualifying meet scenarios. The achievement value measured in absolute terms was even more noticeable in reasonings about athletes of different ability levels. It was often argued that competing in a qualifying competition was not worth the risk for an average level athlete, while it was important to give the athlete a chance if she was one of the best. Conversely, competing in an 'unimportant' tournament was regarded as not worth the risk for a best athlete. The use of such arguments implies that differing probability-of-success estimates determine the types of risks that coaches are willing to take with athletes of different ability. These differing estimates of achievement probability also seemed to affect the type of information used. In dealing with an average level athlete the coaches were more likely to use the presence or absence of pain as a criterion than with a best level athlete. They were also more likely to talk with the athlete to see if she thought she could compete. Both strategies suggest that without an obvious achievement criterion that can justify competing coaches may turn to other criteria to evaluate whether it is worthwhile to take a risk, and they may become more interested in subjective experiences such as the pain felt or the athlete's own interest to be in that situation. For better athletes they were more likely to personally seek a medical opinion in order to help evaluate the situation.

Although the value of achievement in absolute terms (i.e. competitive success) tended to dominate the statements made by the coaches, the importance of achievement in relative terms (i.e. reaching personal goals) also appeared in their reasoning. The likelihood of competing would similarly increase if the probability for the athlete to have a personally rewarding experience was considered to be reasonable. For example, the argument that competing in this meet may have been the athlete's goal for a long time and that she might feel like a failure if she did not compete, carried the implicit assumption that the coach did not want to rob her of an opportunity to derive a sense of achievement from competing. Occasionally it was reasoned that competing in a tournament was worthwhile for an average athlete because it was better suited to her abilities, which would mean that there was a better chance for her to experience a sense of success or accomplishment.

Regardless of whether the achievement standard was absolute or relative, the relevance of the achievement value was also noticeable in a number of practical considerations that centred around the question of whether reaching a desired level of achievement was realistically possible. These considerations included performance standards (can the athlete perform her routines at a satisfying level?) as well as personality characteristics that would help the athlete to perform better with an injury (e.g. 'mental toughness').

The significance attached to achievement by coaches has been observed before. Strean (1993) pointed out that all the coaches in his study reported some form of achievement to be desirable, be it competitive outcome or personal accomplishments, and that most of them highly regarded excellence as well. He also noted that in many coaches' beliefs there was an implicit assumption that some type of measurable achievement or outcome was more important than the process of striving itself, or more important than non-achievement goals, such as positive affect or social factors. In this study, achievement as competitive success clearly constituted a dominant value affecting the coaches' reasoning. It is possible that by emphasizing the ability level of the athlete and the importance of the competition the coaches' reasoning may have been steered in the direction of the achievement value and, therefore, its relative dominance over non-achievement values may appear bigger than it is. Yet, it is still clear that the achievement value plays an important role in the deliberation of the coaches, in particular when the circumstances accentuate the possibility of competitive achievement, as in the situation of a best athlete entering an important qualifying competition.

The importance of the achievement value does not necessarily mean that placements were the only concern for the coaches. Competing well and making the team implicitly carry a number of potential psychological benefits, in the form of boosted self-esteem, status, a sense of pride and a sense of achievement, benefits which tend to be reinforced easily because of the greater public recognition of these achievements. Although achieving a personal standard may have similar psychological benefits, it may take more effort on the part of the coach and/or the parents to stimulate and maintain such psychological benefits, because they will not be reinforced as much by external sources. By using absolute achievement standards the coaches may have implicitly applied psychological benefit standards; an underlying assumption in the reasoning about average level athletes, for example, may have been that if competitive success is not possible, the athlete could experience a sense of failure, a feeling from which the coaches may want to protect her. On the other hand, it is quite possible that the opportunity for achievement plays such a major role simply because athletic success is valued as an end in itself; the implicit psychological benefits may not at all be part of the coaches' conscious reasoning.

Other values

A number of non-achievement values were also used in the coaches' justifications of their decisions. The opportunity for the athlete to have a learning experience was mentioned quite a few times, particularly an experience that could teach the athlete something relevant to her competitive career. This was an argument that came up more frequently with 8 year old best athletes, and may be interpreted as related to a belief that an important function of youth sport is to 'funnel' talented athletes to the next level (Strean, 1993). It is also implicitly related to the achievement value. Using the opportunity to teach the athlete a 'life lesson' was mentioned by a couple of coaches only, and generally this lesson was thought to ensue if the athlete competed with the injury. None of the coaches in the study contended that *not* letting the athlete compete could teach her a life lesson (e.g. learning to deal with disappointments). The only time this was mentioned was during the pilot work for this study, when one of the interviewed gymnastics coaches explicitly stated that this occasion could be used to teach the athlete the value of delayed gratification.

While the achievement value may implicitly carry an appreciation of psychological benefits without coaches having a conscious cognizance of these benefits, a number of considerations explicitly valuing psychological outcomes were also found. Among these values were the wish to have athletes who are happy, as reflected in the tendency to increase the likelihood of competing if the athlete was very eager, a concern with the effect of competing or not competing on the athlete's self-esteem, and the possibility for the athlete to have fun and/or experience a sense of belonging. The latter value was used in different ways by different coaches. For some the belief that the athlete would be deprived of a time to have fun or of a shared experience with her club mates would lead them to increase the likelihood of competing. For a few others, this deliberation would not affect the decision to let the athlete compete, but it would stimulate them to search for other ways to still let the athlete have fun and make her feel part of the group. This, combined with the value placed on achievement and athletic excellence, suggests that while psychological benefits for the athlete are valued as desired outcomes, coaches may not always have appropriate knowledge or sufficient understanding of alternative ways to arrive at these outcomes. Athletic achievement may be seen as the only or most important way to gain these psychological benefits, and not much attention is given to thinking of other means through which these benefits can be derived.

Risk judgments and values

The role of values in determining participation becomes more important when the physical risks of competing are perceived to be relatively low. However, since some values, the achievement value in particular, appear to have such a strong influence, one has to wonder if risk judgments are (or can be) free from value effects. There is some indication that they are not, or at least that sometimes the risk judgments may be affected by the coach's value system. For example, a favourable interpretation of the healing time (i.e. sufficient time had passed for the injury to heal) was associated solely with a qualifying meet, which suggests that if competing is considered important, there may be a tendency to interpret the symptoms of the injury in a favourable light.

Overall, the results of this study indicate that the achievement value influences the decision process from the beginning, (potentially) affecting not only the risk judgments, but also the managing strategies employed to arrive at those judgments (e.g. seeking different sources of information for average and best athletes) and the deliberations of whether taking the risk is worthwhile. It appears that the first issue that is being evaluated in coaches' minds is whether competing was important in the first place. The managing strategies and risk judgments seem to depend partly on the answer to this question. If this answer is no, for example because the athlete is of average ability or the meet is less significant, the decision is easy. If the answer is somewhere in the middle, for instance, competing is not important for the athlete's ranking, but it may be important for other reasons, for example her self-esteem, the coaches look for other sources of information (e.g. what does the athlete herself want?). If the answer is yes, the managing strategies are affected in that more effort seems to be exerted and other sources of information are used. In addition, there is a higher chance that risk judgments will be positively biased.

Differences between competitive levels

The findings of this study suggest that coaches at different competitive levels do make their decisions differently, with the difference between elite and lower levels being the most perceptible. The results indicated in particular that coaches at the elite competitive levels were more cautious in their choices and appeared to take less risk than coaches at the lower and intermediate competitive levels. This implies that the values transferred through the media may not accurately represent the values that are actually operating at the elite amateur level.

Overall, it seemed that elite level coaches had a 'broader' vision regarding the importance of competing. They appeared to be able to place the need for competing on an injured ankle into a wider perspective than coaches at lower competitive levels. This may be partly due to the structure in which they operate, with a lot more opportunities for competition that allow athletes to achieve some form of success. It is also possible that what is shown on television are **the** most important meets, and that coaches and athletes are more willing to take risks at these once-a-year or once-in-four-years events. The decisions assessed in this study may not have reflected the values that go into decisions regarding such unique and high-profile events, since qualifying meets may not be as important at this level because of the possibility of petitioning. In comparison, at the lower levels, particularly high provincial levels (class III and IV), the qualifying meets for Western Canadian championships may be comparable in importance to World Championships or Olympic Games for elite level athletes, and possibly the reactions of the coaches at these levels were in fact similar to what the reactions of elite coaches might be if the competition concerned their athlete's most important meet. On the other hand, it is conceivable that the coaches at the national and international level did indeed have more encompassing and more developed philosophies, that enabled them to take a step back and evaluate the situation in a broader perspective. Most of these coaches were older, and had spent considerable time in coaching, which may have provided them with more opportunities and experiences to put the value of competing in perspective in relation to other life experiences. One of them commented for example: *"A long time ago I always used to .... the higher the level, the more I was flexible. Now I am the other way around, the higher the level, the less I am flexible; I am only going to give them a shot at doing well."* These coaches had generally also completed higher levels of NCCP certification, and they had taken more workshops and clinics in injury care and management, which presumably would make them more aware of the risks involved in putting stress on insufficiently healed tissue.

In comparison to the elite level coaches, the lower and intermediate level coaches (i.e. class I - IV) tended to be more sensitive to the importance of the competition and the likelihood of a best athlete competing, as was indicated by the finding that they were willing to take more risks with better athletes who had more chances of success than with athletes who had less chances of success at important competitions. The achievement value in absolute terms appeared to be especially present in the reasoning of coaches at the intermediate levels (class III and IV), who most often supported their decisions with arguments like "it is important that she competes" associated with a best athlete, or "a qualifying meet is important", seemingly applying the value of competitive achievement as an end in itself. These coaches were also most likely to interpret the healing time in a favourable way. The achievement orientation, that is, the importance attached to the possibility of competitive success seemed to have the most powerful effect on the decisions of the coaches at this level, more so than on those of the elite level coaches. Future studies will have to confirm whether there are indeed differences in ideology between coaches involved at different competitive levels. It is important to study the value systems and ideologies operating at the various competitive levels more closely, paying attention to the factors that tend to reinforce the value placed on competitive achievement as an end in itself, as well as to factors that may serve to help place this value in a broader perspective.

It is hard to say whether the seemingly stronger presence of the achievement value at the intermediate and lower competitive levels is indeed due to a 'trickle down' effect of the values portrayed in the media, as suggested by several authors (Flint, 1988; Heil, 1993b; Strean, 1993). It is possible that the media merely reflect values that already exist. The fact that a number of non-elite coaches said that their decisions might be different if they were dealing with national or international level athletes indicates that there is indeed a perception that more risks are taken at the elite levels. However, these comments also indicated that at least these coaches clearly distinguished their own situation from the elite levels. It is interesting that these statements were only made by coaches in cluster I, who were the most cautious. Perhaps this insight is only arrived at once someone has had a bad experience with competing injured; such an experience may compel a person to evaluate the value of the risks taken.

Methodological Issues

Telephone interviews

Approaching coaches via the telephone proved quite useful in this study, for two reasons. First, it would not have been possible, or not as easy, to collect verbal justifications of decisions via mail surveys. Second, with a limited population as a subject base there is a concern to reach as many individuals as possible. Although response rates to mail surveys have been fairly high in studies involving Canadian university coaches (varying between 60-94 %, Chelladurai et al., 1989; Duke & Corlett, 1992; Flint & Weiss, 1992; Gordon, 1986), there was no guarantee that club coaches would respond with similar enthusiasm, and response rates for studies involving other populations have generally not been as high (de Vaus, 1990). Using a telephone survey seemed to be the most appropriate way to keep control over the response rate. Coaches tend to have busy lives, and they may not have the time to sit down and fill out a questionnaire, but since talking is generally easier than writing, they may be more willing to respond to questions over the phone. Furthermore, the willingness to take part in a study may increase through personal contact with the investigator. An additional advantage of using a telephone interview rather than a mail survey was that inquiries could be made, both by the responding coach as well as by the researcher if things were not clear. An advantage in comparison with face-to-face interviews was that a greater number of interviews could be conducted over a bigger geographical area.

However, the method also had several drawbacks. Making the calls and transcribing 64 interview tapes of 45 minutes average length was quite time consuming. Trying to get in touch with the coaches was sometimes frustrating, in particular with the few coaches who were apparently not willing to participate but did not say this directly, despite the assertion in the letter that they were free to refuse, and rather conveyed the message by never being available. The method may also have had an effect on the transfer of the information contained in the scenarios. The coaches were encouraged to make some notes during the presentation of the scenarios, as a reminder, but they were not told what aspects to write down. They were always asked if they had any questions or wanted to hear the scenario again, but the majority of the coaches indicated that they understood the scenario and had enough information to respond. After the first two scenarios the description of the injury symptoms was shortened to mere labels with short descriptions. It is hard to say what effect, if any, this had on the responses. It is possible that the coaches after the first scenarios containing the descriptions of the injury generally reacted to the labels 'severe' and 'moderate' injury, rather than to a clear picture of the description of these injuries, even though they were encouraged to make notes on the description of the injuries. The qualifier 'moderate' may have been interpreted as 'not something to worry about too much' in the remaining scenarios. However, the two clusters differed significantly ($p < .001$) in their likelihood scores from the first scenario on, which suggests that the interpretation of the seriousness of the injury was varied between the clusters regardless of whether they were reacting to the labels 'moderate' versus 'severe' or to the description of the symptoms of the injuries. This implies at minimum that the difference between using a description and using labels did not affect the distinction between the two clusters, i.e. the impression that the injury made on coaches with differing injury backgrounds remained differentiated.

Order effect

Although the order in which the scenarios were presented to the coaches was randomized across the parameter levels, there was no randomization across coaches; each coach was presented with the same order of scenarios. This had several consequences for the study. First of all, even though there was no logical order in the presentation of the parameter levels, the decision policies may have been affected by the fact that the first scenario contained an 8 year old athlete of average ability with a moderate injury competing in an important qualifying meet. There may have been an anchoring effect, with this scenario 'setting the stage' for the rest of the scenarios. It is possible that the likelihood scores of the subsequent scenarios would have been different if the first scenario had contained, for example, a 15 year old best athlete. The finding that the 8 year old average athlete with a moderate injury was the only case where competing was more likely in a tournament than in a qualifying competition may be due to an effect associated with the latter scenario being the first. However, it is still plausible that in the case of average 8 year old athletes with a moderate injury coaches are indeed more inclined to allow the athlete to compete in a tournament than in a qualifying competition. The fact that for coaches at one of the competitive levels (class III and IV), the likelihood of competing for this athlete was not higher in a tournament but in a competition, suggests that this difference may be due to a genuine policy, rather than an order effect.

Another consequence of the lack of randomization across coaches was the fact that more statements were made in response to the first couple of scenarios than later in the interview, which resulted in a biased distribution of the statements regarding the parameter levels that were over-represented in the first scenarios (i.e. 8 year old athletes and qualifying meets). Although the general order effect was mostly overcome by using relative frequencies in relation to each particular scenario, some remnants of this effect were still noticeable, and it would have been more expedient had the presentation of the scenarios been randomized across coaches as well. This is strongly recommended for any duplication or execution of a similar study in the future.

Statements

Using spontaneous justifications had the advantage of providing insight into the dominance structure that led the coaches to make the choice that they made. The method used in this study could be refined, but seems useful for analyzing this type of information. It provides a way of quantifying verbal statements indicative of dominance structures, and by doing so linking external factors to the types of justifications that are used to support a decisional choice; in this way this method helps to provide insight into the cognitive processes that mediate a relationship between personal or situational characteristics and variance in decision outcomes.

A form of intra-coder reliability was used to establish a measure of trustworthiness regarding the occurrence of the statements in the coaches responses. Limited resources did not allow for the use of additional coders to substantiate inter-coder reliability. It is recommended however, to establish reliability through inter-coder checking in future studies.

Generalizability to real life situations

Although the coaches appeared genuine in their efforts to report what they would do if a situation like the ones presented would occur, there is no guarantee that they would actually decide that way if a similar situation arose in real life. While hypothetical cases have been used by many researchers to infer the relationship between case characteristics and decision output, there have been some indications that the models constructed on the basis of a series of hypothetical cases may not be similar to those constructed on the basis of a series of real life decisions. Ebbesen and Konecni (1982) as well as Rovner et al. (1986) found that the decision rules derived from hypothetical cases did not match the decision rules derived from actual cases. The results of these studies imply that people when making judgments regarding hypothetical cases use their knowledge differently or are influenced by other factors than in real life situations. Rather than solely relying on their internal knowledge base, as they have to do in studies involving hypothetical cases, factors like time constraints, social influences, motivation may lead them to access their knowledge base in a different way in real life. This is an area that sorely needs more attention. Thus far only two studies have indicated that there is a difference in the relation between input and output regarding hypothetical and real instances. More research is needed to explore how situational factors present in real life operate in affecting decisions, and to determine whether there are circumstances where the reactions to hypothetical cases or scenarios do reflect more accurately the decision policies and outcomes of decisions taken in everyday life.

In the present study the coaches needed to rely on their stored knowledge. The responses that they gave in the interviews reflected their beliefs about the relationship of the symptoms to the risk involved in competing on the ankle, their values as to how worthwhile it was to take that risk, and also sometimes memories of decisions made in a similar situation. Recalling actual situations, they may not have accurately remembered what they considered, but they likely did remember what they decided, i.e. whether the athlete competed or not. To what extent the knowledge base highlighted in this study will affect actual decisions is a matter of speculation. The two studies mentioned above suggest that real life decisions may be based on other factors than the ones indicated by studies involving hypothetical cases. However, in this study more information than just the weighing of input variables was collected. It seems plausible that people's knowledge base will to a greater or lesser degree determine both the representation of the problem and the generation of alternatives, as well as the dominance structures composed around the various alternative actions, thus affecting their decisions. The precise extent to which the existing knowledge base will affect the decision made may depend on a variety of factors. The results of this study suggest that a history of bad experiences with injuries in competition will somehow influence the assessment of the severity of the injury and the risks involved in competing, leading coaches to make more cautious inferences and predictions, and overall be more prudent in their approach to the situation than coaches without such a history. Furthermore, Strean's (1993) study indicated that coaches try to make their decisions in accordance with their highest ideological priorities, thereby helped or hindered by situational and personal affordances and constraints. It is therefore likely that if coaches have a strongly developed philosophy (i.e. if they have high ideological priorities) regarding injured athletes competing, they will strive to make their decisions according to this philosophy. If they do not have such a well-developed ideology, it is likely that they will be influenced more by situational factors, for example if the athlete is really keen. This reasoning leads to the recommendation that coaches should develop their ideologies strongly in the area of injuries.

Responsibility

It is interesting that most coaches indicated that they were the ones who made the final decision regarding an injured athlete's participation in competition. Only a small number of coaches mentioned that it was the parents' responsibility or that the doctor would be the one to decide. As this corresponds with results of earlier studies about responsibilities of coaches (Flint & Weiss, 1992; Rowe & Robertson, 1986; Stapleton et al., 1984), it raises the question whose responsibility it *should* be to make that decision, a question that has both moral and legal connotations. Three issues are at stake in this respect: the autonomy of the athlete, the responsibility of the coach and the responsibility of the parents.

Paternalism versus autonomy

When it comes to an injured athlete's capability to make a decision that is in his or her own best interest, the athlete's right to make an autonomous decision can be disputed even in the case of mature, adult athletes, because of the internal and external pressures on the athlete to compete. It has been argued that in those cases a form of weak paternalism (deciding or acting for others when they are in such a state of mind that they may engage in possibly self-destructive behavior) can be justified, although it would be best if the athlete voluntarily surrendered the decision-making autonomy to an independent medical expert (Thomas, 1991).

In the case of children paternalism is generally deemed justified. Placing paternalism above autonomy and deciding for the child is therefore not an ethical issue of concern regarding 8 year old athletes; the question with athletes of this age becomes more who should exercise the paternalistic decision, the coach or the parents? If both parties agree on what needs to happen, then there is likely no problem, at least not one that could cause conflict between coach and parents. If there is disagreement however, it becomes a matter of who has the final say. The general rule in our society is that parents have the ultimate responsibility for children under age. However, does this mean that if the parents 'take the responsibility' in letting the athlete compete, this relieves the coach from a duty to act responsibly, as was indicated by some coaches in this study? From a moral perspective, Galasso (1988) proposed that children should have, among other rights, the right to be protected from exploitation by overzealous parents or coaches, and he pointed to both parents and coaches as having the responsibility to protect the athlete against abuse from the other party. From a legal perspective, a coach is supposed to behave as a prudent parent would (Robertson & Robertson, 1988), although there are instances where it can be argued that a coach has 'supraparental' expertise (Barnes, 1987), which implies that he or she should act more professionally than can be expected of a prudent parent. Both perspectives suggest that there is a responsibility for the coach to try and do everything that is within his or her power to prevent an injured athlete from competing if it is unsafe for this athlete to do so. Some coaches in this study indicated that they felt rather helpless in relation to parents who would want their daughter to compete when they personally thought she should not compete. Other coaches however, mentioned options that they felt were available to them if the parents themselves did not behave as prudent parents would. Two options were specified, the first consisting of trying to convince the parents that it is better for their daughter not to compete, i.e. play an educational role. Coaches might involve a medical doctor or physiotherapist in this process. The second option consisted of refraining from coaching the athlete at the competition. This option would be considered as a last resort, if the verbal persuasion was unsuccessful and the parents were still adamant to have the child compete. However, whereas withholding coaching support might protect the coach, the athlete would still be the one to suffer. It may be better in such last-resort cases to explore administrative options to cancel the athlete's registration or prevent her from registering.

With a 15 year old athlete the situation of responsibility becomes somewhat more complicated, since the athlete is further along the road to becoming a mature individual, capable of autonomous decision making. The question of the necessity of paternalistic decision making is more pertinent in this case. It was found that most coaches acted in line with Galasso's (1988) recommendation that children should be gradually introduced to autonomy in decisions affecting themselves, as a means of helping them become autonomous through self-determination. By giving the athlete more input, but maintaining part of the control by intervening if they thought the athlete made the wrong decision, the coaches seemed to be moving from the more paternalistic attitude that they applied with 8 year old athletes, towards using a more autonomous principle with 15 year olds. This mixture of paternalism and autonomy, which might be seen as an attitude of 'guarded autonomy', seems appropriate for this age group. The amount of autonomy allowed to a 15 year old varied in this process. Some coaches contended that they trusted their athletes enough to make these choices themselves; this confidence seemed to be based on the experience of working with their athletes for a longer period of time.

However, although on the one hand the principle of autonomy and the rights of young athletes to self-determination is advocated (Galasso, 1988), the question remains as to whether a form of weak paternalism would not be more appropriate in the case of the decision regarding an injured athlete's participation in competition, i.e. is there a need to protect the athlete against her own, possibly self-destructive actions? There is growing evidence that athletes, even mature ones, tend to behave in ways that impede healing when under competitive pressure (Rose, 1991; Weiss & Troxel, 1986; Wroble et al., 1986). However, this study, as well as Flint's (1988) study, suggests that coaches are, or can be, similarly affected by considerations regarding competitive achievements. For this reason, Flint and Weiss (1992) recommended that an athletic therapist should be the one to decide whether an injured athlete can return to competition. Yet, there is no guarantee that even athletic therapists will not be influenced by external factors. Although Flint claimed that athletic therapists were not influenced by factors other than the extent of the injury, her sample size suggests that the power of her tests was not adequate to conclude that the effect was nil. (Granted, the effect was less than that of the factors affecting the decisions made by the coaches.) Thomas (1991) advanced the notion that all persons involved in the decision process of an injured athlete's participation in a competition are potentially encumbered by coercive influences that may prevent them from making a decision that is in the best interest of the athlete. Although Thomas appeared to refer primarily to the situation of (professional) team coaches, team physicians and adult athletes, it is plausible that the same assumption of potential encumberedness applies to coaches and parents of club athletes as well. Thomas suggested that the competitive pressures could prevent those involved from attaining a 'critical distance' that would permit sufficient and rational reflection on the situation and the making of a decision that would benefit the athlete not only in the short but also in the long run, or maybe in the long run only.

This notion of 'critical distance' is interesting, because it provides a concept to help link the psychological and social factors affecting decision making to ethical standards. Given the fact that these types of decisions have to be made by somebody and that competitive pressure is often present, future research can be directed at identifying the factors that may prevent those involved from obtaining a critical distance. The results of the present study suggest a number of those factors, for example, a history of bad experiences with competing injured. Such a history seems to lead coaches to a greater appreciation of the physical risks involved and enable them to evaluate the need to compete in light of the competitive level of the athlete. Moreover, it may make them feel more responsible in making sure that the athlete does not compete.

A good sense of self-esteem would also seem important, because it can help prevent coaches from being drawn to give in to wishes of the athlete out of a need for being 'liked', or from being overpowered by the parents out of a fear of retaliation. Such difficulties in ascertaining one's role as a coach, which seemed to exist especially among some of the younger female coaches involved with athletes at lower levels, may make coaches take risks that they would prefer not to take.

Another factor that may contribute to the ability to create a critical distance involves the presence of a well-developed ideology, including a notion of 'tough love', the recognition that it is better to sacrifice short term positive experiences for long term health and well-being, and the belief that athletes can learn from delayed gratification. Anticipating how the athlete would feel is useful in being able to foresee and respond to her emotional reaction, but it should be kept separate from the decision whether or not she should compete. If too empathic, the coach loses the ability to create a critical distance and evaluate the decision in terms of the long term consequences. A well-developed ideology should also include an apprehension of the implicit psychological benefits resulting from competitive achievement, and an awareness of alternative ways to attain positive psychological outcomes.

Finally, in addition to having a well-developed ideology it is helpful if coaches possess a sound level of self-knowledge. Knowing when one is likely to be influenced by external circumstances or emotional or temperamental factors in a direction that is ideologically not desired may help coaches to manage their decisions in such a way that critical distance can be achieved, as was evidenced by the coach who said that she would make the decision earlier in the week to prevent herself from being influenced by emotional factors if she waited until the night before the meet.

Coaches' ability to attain and maintain a critical distance may also be affected by the availability or absence of well-qualified and trusted medical advice. In order to be trusted, this advice has to include more than the recommendation to 'take two weeks off'; it needs to be informative regarding the types of exercises that the athlete can still do and the types of stress that can be placed on the injured body part at various stages of healing. In addition, the source providing the advice needs to show an understanding of the stresses involved in competitive gymnastics, an appreciation of the level of physical conditioning that the athlete has gone through, as well as an appreciation of the importance attached to competing. In the absence of trusted advice, coaches are more likely to rely on their own judgment. With trusted advice available, a potentially different perspective is offered that may motivate coaches to place the situation in a different light.

Thomas (1991) suggested two management options which might create sufficient critical distance to ensure appropriate care, namely either leaving the decision to a disinterested party -- somebody who is not affected by personal interests in the athlete's participation --, or adopting a model of shared decision making on the basis of valid informed consent, i.e. the necessary information is available to everyone involved in the decision. A disinterested party, could in this situation be the athlete's family physician, or a physiotherapist. It is crucial, however, that this person is perceived as knowledgeable, so that his or her advice will be trusted and accepted as the final say. Considering the tendency of many coaches to delay the decision until the day of the competition, it may be an idea to have a knowledgeable physician, physio- or athletic therapist present at competitions, who can make such last minute decisions regarding the participation of previously injured athletes. But it is important that this person has the authority to veto participation, and is capable of making decisions without personal or emotional involvement.

In the most ideal situation, a shared decision with valid informed consent would be possible if coaches, athletes and parents had a direct and easy access to a support team of cooperating specialists, including a sports-medicine specialist, physiotherapist and sport psychologist, with whom decisions can be made through sharing of information and discussion. However, we don't live in an ideal world, and it is unlikely that such a complete support team will be readily established at any competitive level below the elite. In many cases the decision will probably remain on the shoulders of those directly involved with the athlete, i.e. coach and parents. The most fitting solution for those cases would be a sharing of the decision between coach, parents and physician or physiotherapist, and the athlete depending on her age. This would enable each party to have an educational function, providing the other parties with information regarding the types of stress to be placed on the injury, the physical risks involved in competing on the injury, the potential long term consequences, as well as the psychological impact, in the short and in the long run. Thus it can become an 'informed' decision, and steps can be taken to soften the short term psychological losses that are likely to occur as a consequence of a decision not to compete.

Coaches' decision making

As was pointed out in chapter II, studies in coaches' decision making have been scant, both in scope and in number. Yet, coaches make many decisions, most of which will directly or indirectly affect the lives of their athletes. If we want to gain an understanding of the factors and processes that determine the outcomes of coach-athlete interactions, be they competitive, psychological, social, physical or health-related in nature, it is important that we take a closer look at the role of coaches in the sporting context. The work of Smith and Smoll (Smith & Smoll, 1990; Smith, Smoll & Curtis, 1979) has shown quite convincingly that coaches' behavior affects the psychological well-being of children. However, as Strean (1993, p. 120) succinctly put it: ".. research has shown that coaching behavior influences children, but little has been said about what influences coaching behavior". Focusing on coaches' decisions may be one way of gaining insight into what influences coaches' behavior and the outcomes of that behavior. But this means that the approaches used in the study of coaches' decision making need to become more varied than they have been thus far. Information about decision-making styles, although valuable in itself, does not tell us much about the intricacies and effects of specific decisions. Only a few studies have focused on a particular type of decision that coaches more or less frequently make (Duke & Corlett, 1992; Flint & Weiss, 1992). Neither of these studies made reference to the existing literature regarding cognitive decision-making theories. Yet, it seems relevant when studying coaches' decisions to be aware of this literature. Knowledge of decision-making principles, how heuristics and framing effects operate for example, is useful for an understanding of any human decision-making behavior. Despite their heavy reliance on laboratory designs, which may not always be relevant to everyday decision situations, some of the decision theories advanced in general psychology offer useful viewpoints and methods for the study of coaches' decision making. An important finding for example, has been the relevance of understanding people's knowledge base in order to comprehend their decision-making behavior (Elstein et al., 1990). This points to the necessity to appraise the beliefs and values that coaches hold regarding the issues that they have to decide about, as was also evident in this study. Furthermore, as some investigators of real life decisions have started to point out, a closer look is needed at the validity of using hypothetical cases in the study of decision making. This is certainly an aspect to be aware of when embarking on the study of specific coaching decisions. For studies of the policy-capturing type, investigating the relationship between input factors and decision outcome, many of the decisions that coaches make may be available in sufficient quantities in real life, because they return in every practice or competition. Such decisions may therefore be well suited to be studied in real life situations, reducing the need to rely on hypothetical scenarios. Of course, not all coaches' decisions can or should be studied in this way. It is important however, to focus as much as possible on how coaches make decisions in the actual coaching situation. It is also useful to incorporate not only the antecedents of certain decision outcomes, but the consequences as well.

All in all, in order to gain a deeper understanding of how coaches make decisions, why they make their decisions the way they do and what internal and external factors affect the outcome of their decisions, it is necessary to move from the current limited approach to the study of coaches' decision making to an approach that includes cognitive aspects, actual behaviors and consequences, and shows an understanding of the (social-)psychological dynamics involved in decision making.

A possibly useful strategy to the study of coaches' decision making may be found in the early decision-making literature, when the attention was focused on the rational model of decision-making, with researchers applying their efforts to finding out why and how people failed to make their decisions rationally and devising decision aids and programs that could help individuals to make more rational decisions. A similar approach may be useful in the area of coaches' decision making, although rationality should probably not be the main or only objective. Rather, there would seem to be value in trying to define what correct, optimal or desirable decisions are within various problem situations and coaching settings. Decision-making research can then be aimed at identifying the social, environmental and psychological factors that contribute to those desirable decisions, as well as the factors that hinder such decisions. A lot of the decisions that coaches make are centred around training principles, seasonal and practice planning, and competitive strategies, for which scientifically determined 'optimal' decisions are already known or can be developed. However, the coaching role also entails many decisions that are social in nature and have potentially profound and deep-felt effects on the lives of their athletes. By this very nature, those decisions involve an ethical component. For this reason, the study of decisions of this kind should include at least a consideration of what are ethically right decisions. Martens (1988) advocated the need for a humanistic philosophy of coaching, to be conveyed through coach education programs. He described the philosophy adopted for the American Coaching Effectiveness Program as " Every decision a coach makes should be made first in the best interest of the athlete and then in the pursuit of victory", summarized as "athletes first, winning second" (Martens, 1988, p.299). An important objective of coaches' decision-making research then, should be to lay out how, when and why coaches make decisions that reflect this philosophy, and how, when and why they do not.

Recommendations

A number of directions for further research and some practical suggestions have been brought to attention in this discussion. They will be briefly summarized here.

Further research

As this study was restricted to decisions about hypothetical scenarios involving acute ankle injuries, and to coaches of competitive female gymnasts, a general recommendation for further research in this area is to expand the scope of this study by examining decisions made (a) in real life situations, (b) with regard to male athletes, (c) by coaches in other types of sports and (d) involving injuries of varying severity and type (e.g. overuse versus traumatic; other body parts affected). Some more specific recommendations follow.

This study identified several factors pertaining to the perception of the risks involved in competing with an injury which deserve further attention in future studies. For example, certain beliefs about athlete characteristics (e.g. young athletes heal faster, lighter athletes are at a lower risk) were found to influence risk judgments. Future research needs to examine to what extent such beliefs affect the physical risks perceived to exist in a situation in which an athlete is recuperating from an injury. There was also some indication that risk perceptions are lower, that is, that symptoms tend to be interpreted more favourably, if competing is considered important. This points to a possible effect of values on perception, which requires further investigation. Further inquiry is also needed regarding the finding that coaches with different injury histories differentially approached this situation. Since the coaches in this study had to react to descriptions of injuries rather than to real and visible injuries, it is recommended to test the relationship between injury history and perception of the consequences of an injury further by offering coaches more tangible and closer to 'real life' presentations of injuries, possibly on videotape. Such designs may also be useful to examine more specifically the effects of particular injury symptoms (e.g. degree of swelling, degree of mobility) on coaches' perceptions and decisions.

Creating an accurate impression of the actual risks involved in competing with an injury is often difficult once an injury has progressed to a reasonable state of healing, but is not yet completely healed. An indepth study of a multi-disciplinary and prospective nature, looking at a substantial number of situations where the decision is being made to compete with an injury, may generate a better perspective of the actual risks (physical, psychological and careerwise) involved in competing on an injury. Such a study would document variables like the degree of severity, previous injury history, type and amount of treatment received, the outcome of the competition in terms of performance level, personal feelings and further damage to the injury, as well as longer term consequences.

More research is essential to find out how past experiences have their influences on decision processes and outcomes. For example, are their own bad experiences with injuries part of coaches' conscious deliberations when they make a decision about an injured athlete's participation in competition, or do these experiences affect their decisions at a subconscious level? What does the age at which certain injury experiences occurred have to do with coaches' tendency to be more or less cautious? Is the presence of after-effects of past injuries indeed related to a less prudent approach, and if so, how?

Another area that calls for more investigation involves the content of the types of educational experiences in injury care and management that coaches' receive, and the knowledge structures that result from this education. A more planned format than used in this study may provide an opportunity to examine possible differential effects of particular forms of injury education experience. An approach in which beliefs resulting from participation in workshops etc. are related to the content of the material taught in these workshops may provide an interesting perspective.

It may also be useful to devote a study to the possibilities and limitations that exist for clubs of various competitive levels to arrange easy access to appropriate medical care and advice, in particular in smaller and more remote communities.

Furthermore, future studies should take a closer look at how coaches' perceptions of an athlete's personal characteristics affect their decision making. Specific attention needs to be paid to how psychological attributes such as mental skills in competition, pain tolerance, self-esteem and the need for social acceptance, in combination with the athlete's physical characteristics and talentedness, regulate coaches' decisions.

Finally, further studies are desired in the area of ideology. In particular, future studies need to be designed to study the differences in value systems operating at the various competitive levels, and the (potential) effects of these values on the psychological and physical development and experiences of the athletes. A study that may be useful from a practical perspective may simply entail observation and interviewing of coaches who are capable of providing alternate experiences that lead to positive psychological outcomes. In this way a collection of ideas and strategies may be generated that can be shown or taught to other coaches to increase their arsenal of approaches and enrich their coaching.

Practical recommendations

Although this study was of an exploratory nature, some recommendations for practical interventions can be formulated. A few suggestions concern the improvement of coach education programs. Despite the fact that the amount of injury education was not related to a more or less prudent approach to the decision about an injured athlete's participation in competition, it does not seem a luxury to pay more attention to the risks involved in competing on an injury. Because not many coaches appeared to be aware of the risk of growth plate injuries for younger athletes - a risk that is not necessarily absent for 15 year olds either - this is a subject that needs to be brought to their attention as well. It also seems useful to focus on the process of making a decision about the activities that an injured athlete can do, as well as on the process of making ethical decisions in general. As has previously been advocated by Martens (1988) and Strean (1993), more attention needs to be given to helping coaches develop an awareness of their values and of the purpose of (youth) sports. Particular heed needs to be paid to the potential negative and positive results of a strong adherence to the achievement value. There is a need to help coaches think about the appropriateness and the manifestations of the achievement value, to help them become aware of what athletic success represents and to make them think of alternative ways to reach positive psychological outcomes within the sporting context, without jeopardizing positive physical outcomes (and vice versa). This may be done by de-emphasizing the importance of winning or competitive ranking, and putting more emphasis on the other values that are also present in the sport context, such as friendship, fun, the pleasure of moving, experiencing a sense of skilfullness, and developing interpersonal skills and autonomy.

Self-esteem may be an issue among younger female coaches. In helping coaches think about their values and goals for youth sport it may be necessary to provide them with practical knowledge about how to deal with challenges from athletes and parents and how to assert themselves.

The finding that the majority of the coaches did not perceive family doctors to be knowledgeable enough about athletic injuries to provide appropriate recommendations suggests that family physicians could use an update on the state of injury treatments and on the training conditions of competitive athletes. On the other hand, it may be necessary to make coaches aware of what they can reasonably expect from a general practitioner, and of the alternatives that are available for additional diagnosis and treatment recommendations. Education on both sides may be in order.

Furthermore, the tendency to delay the decision until the day of the competition, found especially among the non-elite coaches, needs some attention. While this tendency is understandable, because the longer one waits, the more healing can be expected to have taken place, it also increases the likelihood of being affected by the pressure to compete. For this reason it may be useful to have an appropriately trained physician, physio- or athletic therapist in attendance at the meet who can be consulted or who even has the authority to decide whether previously injured athletes can compete. This person also needs to be in charge of the decision of whether an athlete who becomes injured during the competition can continue or not (Flint & Weiss, 1992).

Final comments

This study had a broad purpose of providing insight into the area of coaches' decision making regarding an injured athlete's participation in competition. In particular, the focus was on how situational and individual factors influence the thought patterns of coaches in leading them to decide whether to allow the athlete to compete or not. At the same time, there was an interest in ascertaining how decision-making theories, although developed mostly on the basis of laboratory studies, would fit with a real life decision. This study seemed to contribute to insights in both areas, and did tie together some of the theoretical and real life issues. It provided a perspective that may be useful for further research in real life decision making, and for coaches' decision making in particular.

Generally, this study supports Flint and Weiss' (1992) conclusion that coaches' decisions about injured athletes' participation in competition are affected by more factors than just the degree of seriousness of the injury. Values reflecting the importance of competitive achievement and positive psychological outcomes play a major role in coaches' decisions. If competing is considered important when there is no injury, the likelihood of competing with the injury will be higher. Even when the eventual decision is not to compete, more effort and deliberation will have been expended than if competing was not initially considered important.

Values and risk perception have to be juxtapositioned, in order to perform a delicate balancing act each time a decision needs to be made regarding an injured athlete's participation in a competition. Coaches' personal histories with injuries were shown to be related to the perception of physical risks. Coaches who had had first or second hand experiences with detrimental consequences of competing injured were less likely to underestimate the risks and more likely to decide against competing. Even these coaches though, were sensitive to achievement and psychological outcome values, and admitted that it was harder to let concerns about the injury prevail if there were important achievement and psychological outcomes at stake.

This study highlighted the importance of the achievement value. By its very nature, competitive sport endorses the achievement value. It is logical that if one accepts this value as a primary goal, it is hard to give it up, and it is understandable that efforts are directed at trying to maintain an opportunity for competitive achievement if this value is threatened. The possibility of competitive achievement invariably made the difference between competing or not competing, and especially in the case of good versus average athletes in important competitions. However, the potential negative physical consequences of putting stress on injured tissue are the same regardless of the athlete's ability level. It is important that coaches are made more aware of the risks involved and learn to realize that oftentimes they are responsible for younger and growing athletes, in an environment where the stakes are certainly not as high as in elite situations. Perhaps more attention can be paid to non-achievement values, for example, putting a greater emphasis on learning and fun, and deriving pleasure from moving itself and from a sense of bodily control.

For the individual coach, decisions regarding an injured athlete's participation in competition often seem to come down to a cost-benefit analysis of weighing potential physical gains and losses against competitive and/or psychological gains and losses. When using competitive achievement criteria, coaches may not be fully aware of the implicit psychological benefits; when using psychological criteria, they may not be sufficiently aware of the physical risks involved. It is imperative to help coaches, through meaningful research, education and communication with medical professionals, to establish as accurate a perception of risks as possible, but also to reside on the side of caution when things are ambiguous.

REFERENCES

Aanstoos, C.M. (1986) Phenomenology and the psychology of thinking. In P.D. Ashworth, A. Giorgi & A.J.J. de Koning (Eds.) Qualitative research in psychology. Pittsburgh, PA: Dubuque University Press, 79-116.

Aikenhead, G.S. (1984) Teacher decision making: The case of Prairie High. Journal of Research in Science Teaching, 21(2), 167-186.

Anderson, N. (1974) Cognitive algebra: Integration theory applied to social attribution. In L. Berkowitz (Ed.) Advances in experimental social psychology (vol. 7). New York: Academic Press.

Anderson, N. H. (1981) Foundations of Information Integration Theory. New York: Academic Press.

Anderson, N. H. (1982) Methods of Information Integration Theory. New York: Academic Press.

Arnheim, D.D. (1985) Modern principles of athletic training (6th ed.). St. Louis: Times Mirror/Mosby.

Bale, P. & Goodway, J. (1990) Performance variables associated with the competitive gymnast. Sports Medicine, 10(3), 139-145.

Barnes, J. (1987) Sports in the courts; Liability of coaches and teams. Internal report. Ontario: Canadian Bar Association.

Beach, L.R. & Mitchell, T.R. (1978) A contingency model for the selection of decision strategies. Academy of Management Review, 3, 439-449.

Bettman, J.R. & Park, C.W. (1980) Effects of prior knowledge and experience and phase of the choice process on consumer decision processes: A protocol analysis. Journal of Consumer Research, 7, 234-248.

Biel, A. & Montgomery, H. (1989) Scenario analysis and energy politics: The disclosure of causal structures in decision making. In H. Montgomery & O. Svenson (Eds.) Process and structure in human decision making (pp. 243-260). Chichester, UK: Wiley & Sons.

Billings, R.S. & Marcus, S.A. (1983) Measures of compensatory and noncompensatory models of decision behavior: Process tracing versus policy capturing. Organizational Behavior and Human Performance, 31, 331-352.

Booher, J.M. & Thibodeau, G.A. (1989) Athletic injury assessment. St. Louis: Times Mirror/Mosby.

Borko, H. & Cadwell, J. (1982) Individual differences in teachers' decision strategies: An investigation of classroom organization and management decisions. Journal of Educational Psychology, 74(4), 598-610.

Brannick, M.T. & Brannick, J.P. (1989) Nonlinear and noncompensatory processes in performance evaluation. Organizational Behavior and Human Decision Processes, 44, 97-122.

Brehmer, A. & Brehmer, B. (1988) What have we learned about human judgment from 30 years of policy capturing? In B. Brehmer & C.R.B. Joyce (Eds.) Human judgment: The SJT view. North Holland: Elsevier Science, 75-114.

Brehmer, B. (1988) The development of social judgment theory. In B. Brehmer & C.R.B. Joyce (Eds.) Human judgment: The SJT view. North Holland: Elsevier Science, 13-40.

Brehmer, B. & Joyce, C.R.B. (Eds.) (1988) Human judgment: The SJT view. North Holland: Elsevier Science.

Brunswik, E. (1934) Wahrnehmung und Gegenstandswelt. Grundlegung einer Psychologie vom Gegenstand her (Perception and the world of objects: The foundations of a psychology in terms of objects). Leipzig und Wien: Deuticke.

Brunswik, E. (1952) The conceptual framework of psychology. Chicago: University of Chicago.

Butcher, E. & Scofield, M.E. (1984) The use of standardized simulation and process tracing for studying clinical problem-solving competence. Counselor Education and Supervision, 24(1), 70-84.

Caine, D.J. (1990) Growth plate injury and bone growth: An update. Pediatric Exercise Science, 2, 209-229.

Caine, D. & Cochrane, B., Caine, C. & Zemper, E. (1989) An epidemiologic investigation of injuries affecting young competitive female gymnasts. The American Journal of Sports Medicine, 17(6), 811-820.

Campbell, D.J. (1988) Task complexity: A review and analysis. Academy of Management Review, 13(1), 40-52.

Capon, N. & Burke, M. (1980) Individual, product class, and task-related factors in consumer information processing. Journal of Consumer Research, 7, 314-326.

Capon, N. & Davis, R. (1984) Cognitive ability measures as predictors of consumer information-processing strategies. Journal of Marketing Research, 11, 551-563.

Chan, C.S. & Grossman, H.Y. (1988) Psychological effects of running loss on consistent runners. Perceptual and Motor Skills, 66, 875-883.

Carroll, J.S. & Johnson, E.J. (1990) Decision research; A field guide. Newbury Park, CA: Sage.

Chaumeton, N.R. & Duda, J.L. (1988) Is it how you play the game or whether you win or lose? The effect of competitive level and situation on coaching behavior. Journal of Sport Behavior, 11(3), 157-175.

Chelladurai, P. (1986) Styles of decision making in coaching. In J.M. Williams (Ed.) Applied sport psychology: Personal growth to peak performance (pp. 107-119). Palo Alto, CA: Mayfield.

Chelladurai, P. & Arnott, M. (1985) Decision styles in coaching preferences of basketball players. Research Quarterly for Exercise and Sport, 56(1), 15-24.

Chelladurai, P. & Haggerty, T.R.A. (1978) A normative model of decision styles in coaching. Athletic Administration, 13(1), 6-9.

Chelladurai, P., Haggerty, T.R.A. & Baxter, P.R. (1989) Decision style choices of university basketball coaches and players. Journal of Sport and Exercise Psychology, 11, 201-215.

Clarkson, G.P. (1963) A model of the trust investment process. In E.A. Feigenbaum & J.Feldman (Eds.) Computers and thought. New York: McGraw-Hill.

Cohen, J. (1988) Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum.

Dalgleish, L.I. (1988) Decision making in child abuse cases: Applications of Social Judgment Theory and Signal Detection Theory. In B. Brehmer & C.R.B. Joyce (Eds.) Human judgment: The SJT view (pp. 317-360). North Holland: Elsevier Science.

Danziger, R.C. (1982) Coaching humanistically: An alternative approach. The Physical Educator, 39, 121-125.

deVaus, D.A. (1990) Surveys in social research. (2nd. ed.) London: Unwin Hyman.

Driver, M.J. & Mock, T.J. (1975) Human information processing, decision style theory and accounting systems. The Accounting Review, July, 490-508.

Duke, A. & Corlett, J. (1992) Factors affecting university women's basketball coaches' time-out decisions. Canadian Journal of Sport Sciences, 17(4), 333-337.

Duquin, M.E. (1984) Power and authority: Moral consensus and confirmity in sport. International Review for the Sociology of Sport, 19(3/4), 295-304.

Ebbesen, E.B. & Konecni, V.J. (1982) An analysis of the bail system. In V.J. Konecni & E.B. Ebbesen (Eds.) The criminal justice system: A social-psychological analysis (pp. 191-229). San Francisco: Freeman.

Edwards, W. (1954) The theory of decision making. Psychological Bulletin, 51(4), 380-417.

Edwards, W. (1961) Behavioral decision theory. Annual Review of Psychology, 12, 473-498.

Einhorn, H.J. (1970) The use of nonlinear, noncompensatory models in decision making. Psychological Bulletin, 14(3), 534-552.

Einhorn, H.J. & Hogarth, R.M. (1981) Behavioral decision theory: Processes of judgment and choice. Annual Review of Psychology, 32, 53-88.

Einhorn, H.J., Kleinmuntz, D.K. & Kleinmuntz, B. (1979) Linear regression *and* process-tracing models of judgment. Psychological Review, 86(5), 465-485.

Eiser, R. & van der Pligt, J. (1988) Attitudes and decisions. London: Routledge.

Elman, J.B. (1986) The loneliest of the long-distance runners. Runners World, July, 34-39.

Elstein, A.S., Shulman, L.S. & Sprafka, S.A. (1978) Medical problem solving. Cambridge MA: Harvard University Press.

Elstein, A.S., Shulman, L.S. & Sprafka, S.A. (1990) Medical problem solving: A ten-year retrospective. Evaluation and the Health Professions, 13(1), 5-36.

Ericsson, K.A. & Simon, H.A. (1980) Verbal reports as data. Psychological Review, 87(3), 215-251.

Eysenck, H.J. (1967) The biological basis of personality. Springfield, IL: Thomas.

Eysenck, H.J. & Eysenck, M.W. (1985) Personality and individual differences. New York: Plenum Press.

Fine, P.G. (1993) The biology of pain. In J. Heil (Ed.) Psychology of sport injury (pp. 269-280). Champaign, IL: Human Kinetics.

Fiske, S.T. & Taylor, S.E. (1984) Social cognition. Reading, MA: Addison-Wesley.

Flint, F.A. (1988) Returning injured athletes to competition - a role and ethical dilemma for coaches and athletic trainers Doctoral in-lieu-of-thesis, University of Oregon.

Flint, F.A. & Weiss, M.R. (1992) Returning injured athletes to competition: A role and ethical dilemma. Canadian Journal of Sport Sciences, 17(1), 34-40.

Ford, I.W. & Gordon, S. (1993) Social support and athletic injury: The perspective of sport physiotherapists. The Australian Journal of Science and Medicine in Sport, 25(1), 17-25.

Ford, J.K., Schmitt, N., Schechtman, S., Hults, B.M. & Doherty, M.L. (1989) Process tracing methods: Contributions, problems, and neglected research questions. Organizational Behavior and Human Decision Processes, 43, 75-117.

Friedman, C.P. & Slatt, L.M. (1988) New results relating the Myers Brigges Type Indicator and medical specialty choices. Journal of Medical Education, 63(4), 325-327.

Fuoss, D.E. & Troppmann, R.J. (1981) Effective coaching: A Psychological approach. New York: John Wiley & Sons.

Galasso, P.J. (1988) Children in organized sport: Rights and acces to justice. In P.J. Galasso (Ed.) Philosophy of sport and physical activity: Issues and concepts (pp. 324-342). Toronto: Canadian Scholar's Press.

Galotti, K. (1989) Approaches to formal and everyday reasoning. Psychological Bulletin, 105(3), 331-351.

Gordon, A.M.D. (1986a) Behavioral correlates of coaching effectiveness. Unpublished Doctoral Thesis, University of Alberta, Edmonton.

Gordon, S. (1986b) Sport psychology and the injured athlete: A cognitive-behavioral approach to injury response and injury rehabilitation. Science Periodical on Research and Technology in Sport, BU-1, Ottawa: CAC.

Gordon, S. (1988) Decision-making styles and coaching effectiveness in university soccer. Canadian Journal of Sport Sciences, 13(1), 56-65.

Gordon, S., Milios, D. & Grove, J.R. (1991a) Psychological aspects of the recovery process from sport injury: The perspective of sport physiotherapists. The Australian Journal of Science and Medicine in Sport, 23(2), 53-60.

Gordon, S., Milios, D. & Grove, J.R. (1991b) Psychological adjustment to sport injuries: implications for therapists, athletes, coaches and family members. Sports Coach, 14(2), 40-44.

Gray, G.R. (1990) A comparison of attorney's reasons for settlement in personal injury lawsuits. Journal of Sport Management, 4(2), 147-160.

Hammond, K.R. (1955) Probabilistic functioning and the clinical method. Psychological Review, 62(4), 255-262.

Hammond, K.R., McClelland, G.H. & Mumpower, J. (1980) Human judgment and decision making. New York: Praeger.

Hammond, K.R., Stewart, T.R., Brehmer, B. & Steinmann, D.O. (1975) Social judgment theory. In M. Kaplan & S. Schwartz (Eds.) Human judgment and decision processes in applied settings (pp. 271-312). New York: Academic Press.

Henkel, R.E. (1976) Tests of significance. Beverly Hills, CA: Sage.

Heil, J. (1993a) A framework for psychological assessment. In J. Heil (Ed.) Psychology of sport injury (pp. 73-88). Champaign, IL: Human Kinetics.

Heil, J. (1993b) Referral and coordination of care. In J. Heil (Ed.) Psychology of sport injury (pp. 251-266). Champaign, IL: Human Kinetics.

Hoehn, R.G. (1989) Solving coaching problems: strategies for successful team development. Dubuque IA: WM. C. Brown Direct.

Hoffman, P.J. (1960) The paramorphic representation of clinical judgment. Psychological Bulletin, 47, 116-131.

Hoffman, P.J., Slovic, P. & Rorer, L.G. (1968) An analysis of variance model for the assessment of configural cue utilization in clinical judgment. Psychological Bulletin, 69, 338-349.

Hogg, J.M. (1990) An existential-humanistic approach to coaching as it relates to goal-setting in an individual sport. Unpublished paper, Department of Physical Education & Sport Studies, University of Alberta, Edmonton, Alberta.

Holzman, G.B. & Ravitch, M.M., Metheny, W., Rothert, M.L., Holmes, M. & Hoppe, R.B. (1984) Judgments about estrogen replacement therapy for menopausal women. Obstetrics and Gynecology, 63, 303-311.

Hunsaker, P.L. & Alessandra, A.L. (1980) The art of managing people. Englewood Cliffs, NJ: Prentice Hall.

Ievleva, L. & Orlick, T. (1991) Mental links to enhanced healing: An exploratory study. The Sport Psychologist, 5(1), 25-40.

Jacoby, J., Chestnut, R.W. & Fisher, W.A. (1978) A behavioral process approach to information acquisition in nondurable purchasing. Journal of Marketing Research, 15, 532-543.

Johnson, W.R. & Doherty, M.E. (1983) Social judgment theory and academic advisement. Journal of Counseling Psychology, 30(2), 271-274.

Johnson-Laird, P.N. (1982) Thinking as a skill. Quarterly Journal of Experimental Psychology, 34A, 1-29.

Johnson-Laird, P.N. (1983) Mental models. Cambridge, MA: Harvard University Press.

Kagan, D.M. & Smith, K.E. (1988) Beliefs and behaviors of kindergarten teachers. Educational Research 30(1), 26-35.

Kahnemann, D. & Tversky, A. (1979) Prospect Theory. Econometrica, 47, 263-291.

Kahneman, D. & Tversky, A. (1986) Choices, values and frames. In H.R. Arkes & K.R. Hammond (Eds.) Judgment and decision making: An interdisciplinary reader. Cambridge: University Press.

Kahneman, D., Slovic, P. & Tversky, A. (1982) Judgment under uncertainty: Heuristics and biases. Cambridge: Cambridge University.

Keeney, R.L. & Raiffa, H. (1976) Decisions with multiple objectives: Preferences and value tradeoffs. New York: Wiley.

Kegerreis, S. (1983) The construction and implementation of functional progressions as a component of athletic rehabilitation. The Journal of Orthopedic and Sports Physical Therapy, 5(1), 14-19.

Kent, F. (1982) Athletes wait too long to report injuries. The Physician and Sportsmedicine, 10(4), 127-129.

Klayman, J. (1985) Children's decision strategies and their adaptation to task characteristics. Organizational Behavior and Human Decision Processes, 35(2), 179-201.

Kligman, R.D. (1989) Tort liability for sports injuries. Canadian Insurance Law Review, 1, 153-178.

Konecni, V.J. & Ebbesen, E.B. (Eds.) (1982) The criminal justice system: A social-psychological analysis. San Francisco: Freeman.

Kozielecki, J. (1981) Psychological Decision Theory. Dordrecht, Holland: Reidel.

Kruglanski, A.W. (1989) Lay epistemics and human knowledge: Cognitive and motivational bases. New York: Plenum.

Kuebler-Ross, E. (1969) On death and dying. New York: Macmillan Publishing Company.

Lachmann, S. (1988) Soft tissue injuries. Oxford: Blackwell Scientific.

Lahey, L. (1993) Overuse injuries in children. Pulse (a publication of the Sport Medicine Council of Alberta), 7(2), 1,4-5.

Landry, G.L. & Gomez, J.E. (1991) Management of soft tissue injuries. In P.G. Dyment (Ed.) Adolescent medicine: Sports and the adolescent (pp. 125-140). Philadelphia, PA: Hanley & Belfus.

Lewin, K. (1947) Frontiers in group dynamics. Human Relations, 1, 5-41.

Lord, R.G. & Maher, K.J. (1990) Alternative information-processing models and their implications for theory, research and practice. Academy of Management Review, 15(1), 9-28.

Louviere, J.J. (1988) Analyzing decision making: Metric conjoint analysis. Newbury Park, CA: Sage publications.

Lynn, R. & Eysenck, H.J. (1961) Tolerance for pain, extroversion, and neuroticism. Perceptual and Motor Skills, 12, 161-162.

Lysens, R., Steverlynck, A., Vanden Auweele, Y., Lefevre, J., Renson, L., Claessens, A. & Ostyn, M. (1984) The predictability of sports injuries. Sports Medicine, 1, 6-10.

MacKay, D.A. & Marland, P. (1980) Thought processes of teachers. Centre for Research in Teaching, Faculty of Education, University of Alberta, Edmonton.

Maffulli, N. (1990) Intensive training in young athletes. The orthopaedic surgeon's viewpoint. Sports Medicine, 9 (4), 229-243.

Magnusson, D. (1976) The person and the situation in an interactional model of behavior. Scandinavian Journal of Psychology, 17, 253-271.

Mandelbaum, B.R. (1991) Gymnastics. In B. Reider (Ed.) Sports Medicine, the school-age athlete (pp. 415-428). Philadelphia, PA: Saunders.

Martens, R. (1979) From smocks to jocks. Journal of Sport Psychology, 1(1), 94-99.

Martens, R. (1987) Professional practice; Science, knowledge and sport psychology. The Sport Psychologist, 1 (1), 29-55.

Martens, R. (1988) Helping children become independent responsible adults through sports. In E.W. Brown & C.F. Branta (Eds.) Competitive sports for children and youth: An overview of research and issues. Champaign, IL: Human Kinetics.

Mathews, H.F. (1987) Predicting decision outcomes: Have we put the chart before the horse in anthropological studies of decision making? Human Organization, 46(1) spring, 54-61.

McAuley, E., Hudash, G., Shields, K., Albright, J.P., Garrick, J., Requa, R. & Wallace, R.K. (1987) Injuries in women's gymnastics; The state of the art. The American Journal of Sports Medicine, 15(6), 558-565.

McDonald, S.A. & Hardy, C.J. (1990) Affective response patterns of the injured athlete: An exploratory analysis. The Sport Psychologist, 4(3), 261-274.

Meacham, J.A. & Emont, N.C. (1989) The interpersonal basis of everyday problem solving. In J.D. Sinnott (Ed.) Everyday problem solving: Theory and application (pp. 7-23). New York: Praeger.

Meeusen, R. & Borms, J. (1992) Gymnastics injuries. Sports Medicine, 13(5), 337-356.

Micheli, L.J. (1984) Special considerations in children's rehabilitation programs. In L.Y. Hunter & F.J. Funk (Eds.) Rehabilitation of the injured knee (pp. 406-413). St. Louis, MO: Mosby.

Micheli, L.J. (1989) Sports injuries in children and adolescents. In D.V. Nudel (Ed.) Pediatric Sports Medicine (pp. 177-192). New York: PMA.

Miles, M.B. & Huberman, A.M. (1984) Qualitative data analysis. A sourcebook of new methods. Beverly Hills, CA: Sage.

Montgomery, H. (1989a) From cognition to action: The search for dominance in decision making. In H. Montgomery & O. Svenson (Eds.) Process and structure in human decision making (pp. 23-49). Chichester, UK: Wiley & Sons.

Montgomery, H. (1989b) The search for a dominance structure: simplification versus elaboration in decision making. In D. Vickers and P.L. Smith (Eds.) Human information processing: Measures, mechanisms and models (pp. 471-483). North Holland: Elsevier.

Montgomery, H. & Svenson, O. (1989) A think-aloud study of dominance structuring in decision processes. In H. Montgomery & O. Svenson (Eds.) Process and structure in human decision making (pp. 135-150). Chichester, UK: Wiley & Sons.

Moore, R.A. (1985) Psychological factors in sports injuries. In R.C. Schneider (Ed.) Sports injuries: Mechanisms, prevention and treatment (pp. 830-836). Baltimore, MD: Williams & Wilkins.

Myers, I.B. (1980) Gifts differing. Palo Alto, CA: Consulting Psychologists Press.

Myers, I.B. & McCaulley, M.H. (1985) Manual: A guide to the development and use of the Myers Briggs Type Indicator. Palo Alto, CA: Consulting Psychology Press.

Nardi, B.A. (1983) Goals in reproductive decision making. American Ethnologist, 10(4), 697-714.

National Coaching Certification Program (1991a) Coaching Theory Level I. Gloucester, Ontario: Coaching Association of Canada.

National Coaching Certification Program (1991b) Coaching Theory Level II. Gloucester, Ontario: Coaching Association of Canada.

National Coaching Certification Program (1992) Coaching Theory Level III. Gloucester, Ontario: Coaching Association of Canada.

Newell, A. (1980) Reasoning, problem solving and decision processes: The problem space as a fundamental category. In R. Nickerson (Ed.) Attention and performance VIII (pp. 693-718). Hisdale, NJ: Erlbaum.

Newell, A. & Simon, H.A. (1972) Human problem solving. Englewood Cliffs, NJ: Prentice Hall.

Nisbett, R.E. & Wilson, T.D. (1977) Telling more than we can know: Verbal reports on mental processes. Psychological Review, 84(3), 231-259.

Orlick, T. (1982) Cooperation in sport and life. In J.T. Partington, T. Orlick & J. Salmela (Eds.) Sport in perspective (pp. 167-168). Proceedings of the Fifth World Congress of the International Society for Sport Psychology, Ottawa, Canada, August 1981.

Parker, W.C. & Gehrke, N.J. (1986) Learning activity and teacher's decision making: Some grounded hypotheses. American Educational Research Journal, 23(2), 227-242.

Payne, J.W. (1976) Task complexity and contingent processing in decision making: An information search and protocal analysis. Organizational Behavior and Human Performance, 16, 366-387.

Payne, J.W. (1982) Contingent decision behavior. *Psychological Bulletin, 92*(2), 382-402.

Payne, J.W., Bettman, J.R. & Johnson, E.J. (1988) Adaptive strategy selection in decision making. *Journal of Experimental Psychology: Learning, Memory and Cognition, 14*(3), 534-552.

Pearson, J. (1985) Are teachers' beliefs incongruent with their observed classroom behavior? *The Urban Review, 17*(2), 128-146.

Pedersen, P. (1986) The grief response and injury: A special challenge for athletes and athletic trainers. *Athletic Training*, winter, 312-314.

Peterson, L. & Renstroem, P. (1986) *Sports injuries: Their prevention and treatment*. Chicago, IL: Yearbook Medical Publishers.

Peterson, P.L., Marx, R.W. & Clark, C.M (1978) Teacher planning, teacher behavior and student achievement. *American Educational Research Journal, 15*(3), 417-432.

Petrie, A. (1967) *Individuality in pain suffering*. Chicago, IL: University of Chicago Press.

Pillemer, F.G. & Micheli, L.J. (1988) Psychological considerations in youth sports. *Clinics in Sports Medicine, 7*(3), 679-689.

Porter, M., Noble, H.B., Bachman, D.C. & Hoover, R.L. (1980) Sports-medicine care in Chicago-area high schools. *Physician and Sportsmedicine, 8*, February, 95-99.

Punj, G.N. & Stewart, D.W. (1983) An interaction framework of consumer decision making. *Journal of Consumer Research, 10*, 181-196.

Redfearn, R.W. (1980) Emergency medical skills in high school coaches. *The Physician and Sports Medicine, 8*(11), 115-116.

Reider, B. (Ed.) (1991) *Sports medicine: The school-age athlete*. Philadelphia, PA: W.B. Saunders.

Retton, M.L., Karolyi, B. & Powers, J. (1986) *Mary Lou*. New York: McGraw-Hill.

Robertson, B.W. & Robertson, B.J. (1988) *Sport and recreation liability and you!* North Vancouver, B.C.: Self-Counsel Press.

Rogoff, B. (1984) Introduction; Thinking and learning in social context. In B. Rogoff & J. Lave (Eds.) *Everyday cognition: Its development in social context* (pp. 1-8). Cambridge, MA: Harvard University Press.

Rokeach, M. (1968) *Beliefs, attitudes and values; A theory of organization and change*. San Francisco, CA: Josset-Bass.

Rorer, L.G., Hoffman, P.J., Dickman, H.D. & Slovic, P. (1967) Configural judgments revealed. *Proceedings of the 75th Annual Convention of the American Psychological Association, 2*, 195-196.

Rotella, R.J. (1982) Psychological care of the injured athlete. In D.N. Kulund (Ed.) *The injured athlete* (pp. 213-224). Philadelphia, PA: Lippincott.

Rotella, R.J. & Campbell, M.S. (1983) Systematic desensitization: Psychological rehabilitation of injured athletes. Athletic Training, summer, 140-142.

Rotella, R.J. & Heyman, S.R. (1986) Stress, injury and the psychological rehabilitation of athletes. In J.M. Williams (Ed.) Applied sport psychology: Personal growth to peak performance (pp. 343-364). Palo Alto, CA: Mayfield.

Rose, J.M.C. (1991) Running risks, the risks of running. Unpublished Doctoral Dissertation, Faculty of Education, University of Alberta, Edmonton.

Rose, J. & Jevne, R.F.J. (1993) Psychological processes associated with athletic injuries. The Sport Psychologist, 7(3), 309-328.

Rovner, D.R., Rothert, M.L. & Holmes, M.M. (1986) Validity of structured cases to study clinical decision making. Clinical Research, 34(2), 834A.

Rowe, P.J. & Robertson, D.M. (1986, Summer) Knowledge of care and prevention of athletic injuries in high schools. Athletic Training, 21, 116-117.

Sage, G.H. (1978) Humanistic psychology and coaching. In W.F. Straub (Ed.) Sport psychology: An analysis of athlete behavior (pp. 148-161). Ithaca, NY: Movement Publications.

Sanderson, F.H. (1981) The psychological implications of injury. In T. Reilly (Ed.) Sports fitness and sports injuries (pp. 37-41). London: Faber and Faber.

Schubert, G.W., Smith, R.K. & Trentadue, J.C. (1986) Sports Law. St.Paul, MN: West-Publishing.

Schweiger, D.M. & Jago, A.G. (1982) Problem-solving styles and participative decision making. Psychological Reports, June, 5(3, Pt2), 1311-1316.

Shavelson, R.J. & Stern, P. (1981) Research on teachers' pedagogical thoughts, judgments, decisions and behavior. Review of Educational Research, 51(4), 455-498.

Shavelson, R.J., Cadwell, J. & Izu, T. (1977) Teachers' sensitivity to the reliability of information in making pedagogical decisions. American Educational Research Journal, 14(2), 83-97.

Simon, H.A. (1955) A behavioral model of rational choice. Quarterly Journal of Economics, 69, 99-118.

Simon, H.A. (1990) Invariants of human behavior. Annual Review of Psychology, 41, 1-19.

Sinnott, J.D. (1989) Background: About this book and the field of everyday problem solving. In J.D. Sinnott (Ed.) Everyday problem solving: Theory and application (pp. 1-6). New York: Praeger.

Slovic, P. (1969) Cue consistency and cue utilization in judgment. Journal of Applied Psychology, 53, 255-263.

Slovic, P., Fischhoff, B. & Lichtenstein, S. (1977) Behavioral decision theory. Annual Review of Psychology, 28, 1-39.

Slovic, P. & Lichtenstein, S. (1971) Comparison of Bayesian and regression approaches to the study of information processing in judgment. Organizational Behavior and Human Performance, 6, 649-744.

Smith, A.M., Scott, S.G., O'Fallon, W.M. & Young, M.L. (1990) Emotional responses of athletes to injury. Mayo Clinic Proceedings, 65, January, 38-50.

Smith, A.M., Scott, S.G. & Wiese, D.M. (1990) The psychological effects of sports injuries; Coping. Sports Medicine, 9(6), 352-369.

Smith, R.E. & Smoll, F.L. (1990) Self-esteem and children's reactions to youth sport coaching behaviors; A field study of self-enhancement processes. Developmental Psychology, 26(6), 987-993.

Smith, R.E., Smoll, F.L. & Curtis, B. (1979) Coach effectiveness training: A cognitive-behavioral approach to enhancing relationship skills in youth sport coaches. Journal of Sport Psychology, 1(1), 59-75.

SPSS Categories (1990) Chicago, IL: SPSS.

Stapleton, K.L., Tomlinson, C.M. Shepard, K.F. & Coon, V.A. (1984) High school coaches' perceptions of their responsibilities in managing their athletes injuries. The Journal of Orthopedic and Sports Physical Therapy, 5(5), 253-260.

Steele, V.A. & White, J.A. (1986) Injury prediction in female gymnasts. British Journal of Sports Medicine, 20(1), March, 31-33.

Stewart, T.R. (1988) Judgment analysis: Procedures. In B. Brehmer & C.R.B. Joyce (Eds.) Human judgment: The SJT view (pp. 41-74). North Holland: Elsevier Science.

Strean, W.B. (1993) Coaching ideology: Contextual factors and implications for practice. Unpublished Doctoral Dissertation, Department of Kinesiology, University of Illinois at Urbana-Champaign.

Svenson, O. (1979) Process descriptions of decision making. Organizational Behavior and Human Performance, 23, 86-112.

Taimela, S. (1992) Information processing and accidental injuries. Sports Medicine, 14(6), 366-373.

Taylor, P.M. & Taylor, D.K. (1988) Conquering Athletic Injuries. Champaign, IL. : Leisure Press.

Tesch, R. (1990) Qualitative research: Analysis types and software tools. New York: Falmer.

Thomas, C.E. (1991) Locus of authority, coercion and critical distance in the decision to play an injured player. QUEST, 43, 352-362.

Tversky, A. & Kahneman, D. (1974) Judgment under uncertainty: Heuristics and biases. Science, 185, 1124-1131.

Tversky, A. & Kahneman, D. (1981) The framing of decisions and the psychology of choice. Science, 211, 453-458.

Tversky, A. & Kahneman, D. (1985) The framing of decisions and the psychology of choice. In G. Wright (Ed.) Behavioral decision making. New York: Plenum, 25-40.

Tyszka, T. (1989) Preselection, uncertainty of preferences and information processing in human decision making. In H. Montgomery & O. Svenson (Eds.) Process and structure in human decision making (pp. 181-193). Chichester, UK: Wiley & Sons.

van de Geer, J.P. (1985) HOMALS. University of Leiden, The Netherlands: Department of Data Theory.

van Strien, P.J. (1986) Praktijk als wetenschap; Methodologie van het sociaal-wetenschappelijk handelen [Practice as science; Methodology of social-scientific actions]. Assen, The Netherlands: van Gorcum.

Vergeer, I. (1990) Coaches' decision making. Unpublished paper, University of Alberta, Department of Physical Education and Sport Studies, Edmonton.

von Neumann, J. & Morgenstern, O. (1947) Theory of games and economic behavior (2nd ed.) Princeton, NJ: Princeton University.

Vroom, V.H. & Yetton, P.W. (1973) Leadership and decision making. Pittsburgh: University of Pittsburgh Press.

Waller, W.S. (1988) Brunswikian research in accounting and auditing. In B. Brehmer & C.R.B. Joyce (Eds.) Human judgment: The SJT view (pp. 247-272). North Holland: Elsevier Science.

Weiss, M.R. & Troxel, R.K (1986) Psychology of the injured athlete. Athletic Training, summer, 104-111.

Wigton, R.S. (1988) Application of judgment analysis and cognitive feedback to medicine. In B. Brehmer & C.R.B. Joyce (Eds.) Human judgment: The SJT view (pp. 227-246). North Holland: Elsevier Science.

Wright, G. (1985) Decisional variance. In G. Wright (Ed.) Behavioral decision making (pp. 43-59). New York: Plenum.

Wroble, R.R., Mysnyk, M.C., Foster, D.T. & Albright, J.P. (1986)
Patterns of knee injuries in wrestling at the University of Iowa - a six year study. American Journal of Sports Medicine, 14(1), 55-66.

APPENDIX A : letter to coaches

Edmonton, March 21, 1993

Coach Name
Gymnastics Club
Address

Dear coach:

I am writing to you to request your participation in a study among gymnastics coaches that I am conducting. My name is Ineke Vergeer, and I am a doctoral student at the University of Alberta in the Faculty of Physical Education and Sport Studies. Three years ago I came from the Netherlands to study sport psychology and coaching in Canada with Dr. John Hogg. At this time I am preparing to collect the data for my dissertation and I need your help!

You are probably aware of the fact that there are a lot of decisions to be made in coaching, and that these decisions can sometimes be very hard. I am particularly interested in the deliberation processes of coaches when they have to make difficult decisions. The purpose of my dissertation is to gain insight into the deliberation process of coaches associated with a specific decision, namely the one regarding whether or not an athlete who is injured should participate in a competition.

I have chosen to examine the decisions of competitive gymnastics coaches, primarily because I used to be a gymnast myself and also because I believe that gymnastics coaches in particular are often faced with a situation in which it is hard to decide whether or not an injury should keep an athlete out of competition.

I intend to collect a good portion of my data by way of a telephone survey. I shall be phoning coaches to ask them to complete a questionnaire with me over the phone. On the basis of the information collected by means of this survey I will, at a later stage, select a small number of coaches who will be invited to take part in either a face-to-face or a telephone interview. I am not able to say at this point in time whether you will be approached for a further interview, but I would like to contact you to take part in the telephone survey. It will take about 30 minutes to go through the questionnaire. Follow-up interviews, for those coaches selected, may take one to two hours of your time.

Appendix A: letter to coaches

I will try to contact you by phone sometime during the last week of March or the first week of April. If, for any reason, you can not or do not wish to participate in my study, all you have to do is tell me this when I phone you. You are free not to take part, or to withdraw from the study at any time without any consequences. However, I would be most happy with your cooperation, which would help me to shed a light on the deliberations of coaches when faced with a difficult decision. The results of my study may lead to a program that will assist coaches in their decision making about this problem.

Although I can not guarantee you complete anonymity, since I know whom I am phoning, I do assure you that the information will be handled in strict confidence and that your name will not be associated with any statements made in my dissertation or in any other publication related to this study. The questionnaires will be assigned identification numbers and a list linking these numbers with names will be safely secured separate from the questionnaires; it will be destroyed as soon as a selection of coaches for the follow-up interviews has been made.

I hope to have the opportunity of speaking with you soon. In the mean time, if you have any questions or concerns, please don't hesitate to contact me or my supervisor (Dr. John Hogg) or the Alberta Gymnastics Federation.

Looking forward to talking with you,

Yours sincerely,

Ineke Vergeer

Ineke Vergeer
Department of Physical Education
and Sport Studies
phone: (H) 455-9914
(B) 492-5503

Dr. J.M. Hogg
Department of Physical Education
and Sport Studies
phone: 492-5910

APPENDIX B: questionnaire

Good morning/ afternoon / evening. Can I speak with , please?

Hallo, my name is Ineke Vergeer. I am a doctoral student at the University of Alberta in the Department of Physical Education and Sport studies. Last / This week I sent you a letter to inform you about the research project that I am conducting and for which I would like your help. Did you receive my letter?

if NO: I am sorry it did not reach you. Something must have gone wrong in the mail. The letter was to inform you of this call and the purpose of my study. Do you have some time right now so I can tell you about it?

if NO: That is too bad. Could I phone you back at a more convenient time?

if NO: end conversation
if YES: make appointment

if YES: The purpose of my study is to collect information on how coaches make decisions about whether or not an athlete who is injured should participate in a competition. I would like to complete a questionnaire with you over the phone, and there is a small possibility that I will phone you back later for some more information. But for now you could really help me if you would want to go through the questionnaire with me. It will take a little over half an hour of your time. The information will be strictly confidential. Your name will not be mentioned in any report or publication of this study. Would you mind participating in my study?

if YES: Good. Would you mind participating in my study?

if coach does not want to participate: sorry to have imposed on your time. Thank you for your answer. **End conversation.**

if coach wants to participate: That is great. It will take about 30 to 40 minutes to go through the questionnaire, do you have that much time right now?

if NO: arrange another time to phone back
if YES: start with the questionnaire

START

Do you have any questions that you would like to ask first?

If you do have any questions during the interview, please feel free to ask them at any time.

I first have some arrangements to make. One is that I would like to tape this conversation, just as a backup, because sometimes the answers that people give are a bit long and if I try to write it all down during the interview I either lose some information or you have to wait while I write and the interview will last longer. I will only use the tape as a backup, as soon as I have all the information on paper I will erase the tape. Do you mind if I tape this interview?

if yes: try to write out the answers
if no: Good. I also wanted to ask you if you have a pen and paper handy, because sometime during the interview I will ask you to make a few notes as a reminder. Maybe you can get something to write while I turn on the taperecorder.

ID:

Appendix B: questionnaire

Coach ID: .... Club ID: .... Gender: .... Date: .... Time: .....

---

1) CURRENT COACHING BACKGROUND

I would first like to ask you a little bit about your current coaching situation.

1.1) How many athletes are you coaching at the present time?

1.2) Can you give me an overview of the class and categories that your athletes are competing in? For example, you may have 3 athletes in class II Argo and 4 athletes in class III Argo.

II Pre-Argo
II Argo
II Tyro
II Open

III Pre-Argo
III Argo
III Tyro
III Open

IV Argo
IV Tyro
IV Novice
IV Open

Nat. Novice
Nat. Open
HP Junior
HP Senior

2) INJURY PROCEDURES IN CLUB

2.1) With the athletes that you are coaching, who is usually the person who makes the final decision as to whether or not an athlete who is injured will participate in competition?

1) me 2) head coach 3) parent 4) doctor 5) athlete

comments:

2.2) Are there any formally specified procedures or guidelines in your club as to steps that you have to follow in returning an injured athlete to activity?

1) YES 2) NO 3) Don't know 4) informal guidelines

if yes: A) Can you tell me briefly what these procedures or guidelines are?
answer:

2.3) Do you yourself have a procedure that you usually follow to determine whether an athlete who has had an injury is ready to go back into activity?

1) YES 2) NO

if yes: A) What do you do?
a) When does an athlete usually come back in the gym?
b) How do you determine what the athlete can do?

2.4) Is there a physician or physiotherapist or athletic therapist associated with your club whom you can refer athletes to?

1) YES 2) NO 3) Don't know

comments:

3) FIRST SERIES OF SCENARIOS

I will now describe 2 series of 8 scenarios to you. Each scenario will depict a situation in which an athlete receives an injury and I will ask you for each scenario to indicate, on a scale of 0 to 10, how likely it is that you would allow this athlete to participate in competition. A rating of **10** means that it is highly **likely** that you will allow the athlete to compete, a rating of **0** means that it is highly **unlikely** that you will allow her to compete. It may be helpful if you jot down a line on your paper with a **10** and the words "highly **likely**" on one end, and a **0** and the words "highly **unlikely**" on the other. You may also want to make some notes on the description of the scenario, as a reminder.

If you have any questions, or if you want any additional information, about the athlete or the injury or the conditions that are described in the scenario, please feel free to ask them after I read a scenario to you.

3.1) Moderate 8 Year Old Athlete of Average Ability Important Qualifying Competition
Imagine that you have an 8 year old athlete who sprained her ankle exactly one week ago. She has recovered to the point where there is still some swelling and some minor limitation in the range of motion. She is guarding her foot a little bit and is limping after she performs one or two elements in which she needs her feet. This weekend, there is an important qualifying meet coming up, you can think of Zone Championships or Interprovinical Cup Trials. The athlete says that she is "fine" and she is eager to participate in the competition. This is an athlete of average ability, and although she is enthusiastic and loves gymnastics you would not expect her to place in the top 8 or 10, even with her best performance. It is now the night before the competition, and you have to decide whether or not you will allow her to compete.

Are there any questions that you would like to ask before making your decision, or would you like me to repeat the scenario?

Questions asked (see separate sheet) : **1) No questions asked**

Now, on a scale of 0 to 10, can you tell me how likely is it that you would allow her to compete; **10** is highly **likely**, **0** is highly **un**likely.

score:

comments:

I will now present the next scenario. You will probably notice that there is a pattern to the scenarios, and they will become simpler in their description as I go on.

3.2) Severe 8 Year Old One of Your Best Athletes Important Qualifying Competition
In this scenario there is again an important qualifying competition coming up this weekend. Now imagine that you have an 8 year old who is one of your best gymnasts. She would almost certainly place in the top 8 of her category if she could compete well. However, 3 weeks ago she severely sprained her ankle. She was on crutches for about a week. She has kept her fitness level up by swimming and riding a bike and stretching, but she has done practically no weight bearing activities. This week she has started to do some training, mostly on beam and uneven bars. She has recovered to the point where there is still some swelling and a limited range of motion. She is limping when she walks into the gym. Yet, she is eager to compete again and says that the pain does not bother her. It is now the night before the competition, and you have to decide whether or not you will allow her to compete.

Are there any questions you would like to ask with regard to this particular scenario?

Questions asked (see separate sheet): **1) No questions asked**

Now, on a scale of 0 to 10, can you tell me how likely is it that you would allow her to compete; **10** is highly **likely**, **0** is highly **un**likely.

score:

comments:

In the rest of the scenarios that I will be presenting, I will be talking about either the injury that was described in the first scenario, the "one week ago moderate ankle sprain" or the injury that was described in the second scenario, the "3 week ago severe ankle sprain". I will call the first injury "moderate" injury and the second "severe" injury. Would you like me to repeat the description of the injury?

moderate: some swelling; minor limitation in r.o.m; a little bit of guarding and limping after one or two elements in which she needs her feet

severe: some swelling; a limited r.o.m.; limping when she walks into gym; one week on crutches

3.3) **Severe 8 Year Old One of Your Best Athletes Invitational Tournament**

In this scenario we are talking about a severe injury, so a severe ankle sprain that happened 3 weeks ago. This time the competition that is coming up this weekend is not an important qualifying meet, but an invitational tournament. You can think of Altadore or Taiso invitational. The athlete who sprained her ankle is again 8 years old. She is one of your best athletes and eager to compete. She says that the pain does not bother her.

How likely is it that you would allow her to compete? **score:**

comments:

3.4) **Moderate 15 Year Old Athlete of Average Ability Important Qualifying Competition**

In this situation there is a moderate injury, so a one week old ankle sprain. You have an important qualifying meet coming up. This time, the athlete who sprained her ankle is 15 years old. She is not one of your best athletes, but an athlete of average ability who is enthusiastic, but you would not expect her to place in the top 8 or 10, even with her best performance. How likely is it that you would allow her to compete?

score:

comments:

By now I have mentioned all the possible ingredients of the scenarios. The following scenarios will mainly consist of variations of the previous scenarios. The conditions of the injury are like I described before, the athlete is eager to compete and you have to make the decision the night before the competition. From now on I will just mention the four ingredients of each scenario. That means that I will be talking about either a moderate or a severe injury, an 8 year old or a 15 year old athlete, an athlete of average ability or one of your best athletes, and an invitational tournament or an important qualifying meet. Do you have any questions about any of these ingredients or about the procedure?

Questions: 1) YES 2) NO

questions/comments:

If there is anything you want to ask as I go through the scenarios, please don't hesitate to ask them.

3.5) **Moderate 8 Year Old One of Your Best Athletes Invitational Tournament**

This is again a moderate injury. The athlete is 8 years old and is one of your best athletes. The competition that is coming up is an invitational tournament. How likely is it that you will allow her to compete?

score:

comments:

3.6) Moderate 15 Year Old One of Your Best Athletes Important Qualifying Competition
In this situation, you again have a moderate injury. The athlete is 15 year old and the meet that is coming up is an important qualifying meet, for instance North West Alberta Game Trials, Trials to Western Canadian Championships or Trials for the National Championships. The athlete is one of your best athletes and you would expect her to place in the top 8 if she could compete well. What would your decision be in this situation?

score:

comments:

3.7) Moderate 15 Year Old One of Your Best Athletes Invitational Tournament
Again, in this scenario we are talking about a moderate injury. The competition that is coming up is an invitational tournament. The athlete who has sprained her ankle is one of your best athletes and she is 15 years old. What would your decision be in this situation?

score:

comments:

3.8) Moderate 8 Year Old Athlete of Average Ability Invitational Tournament
In this situation the injury is again moderate. The athlete is 8 years old and of average ability. The competition is an invitational tournament.

score:

comments:

4) COACHING EXPERIENCE

I still have some more scenarios that I would like to go through, but first I would like to ask you some questions about your experience as a coach and an athlete.

4.1) a) How long have you been involved in coaching competitive gymnastics? **time:**

b) Have you coached, competitively
1) both girls and boys 2) girls only 3) boys only?

c) What is the highest level that you have coached? **level:**

d) What is the youngest and what is the oldest age group of competitive athletes that you have coached?

youngest:
oldest:

comments:

4.2) Do you have NCCP certification?
1) YES 2) NO 3) Certification from outside of Canada

if yes:

a) At which level are you certified?

b) How long have you been certified at this level?
years: months:

5) ATHLETIC BACKGROUND

5.1) Have you been a competitive gymnast yourself?
1) YES **2) NO**

if yes:
a) What was the highest level that you competed at? **level:**

6) DEMOGRAPHIC INFORMATION

6.1) Can you tell me the year that you were born in? **19...**

6.2) Can you tell me what type of education you have had?

1) High School **2) College** **3) Bachelor** **4) Masters** **5) PhD**

if Phys.Ed.: a) Which route or specialization?

if non-Phys.Ed.: b) What area of specialization?

7) SECOND SERIES OF SCENARIOS

I will now describe another series of 8 scenarios to you. The scenarios are similar to the first series, with a moderate injury referring to the ankle sprain that occurred one week ago, and a severe injury referring to the severe ankle sprain that occurred 3 weeks ago. Again, the athlete is eager to compete and you have to make the decision the night before the competition.

7.1) Severe 15 Year Old One of Your Best Athletes Important Qualifying Competition
In this scenario there is a 15 year old athlete who severely sprained her ankle 3 weeks ago. The competition that is coming up is an important qualifying meet. The athlete is one of your best athletes and she would almost certainly place in the top 8 of her category if she could compete well. How likely is it that you will let her to participate in the meet?

score:

comments:

7.2) Moderate 15 Year Old Athlete of Average Ability Invitational Tournament
In this scenario the injury is moderate, so an ankle sprain that happened one week ago. The athlete is 15 years old and of average ability. The competition that is coming up is an invitational tournament. How likely is it that you would have her compete?

score:

comments:

7.3) Severe 15 Year Old Athlete of Average Ability Important Qualifying Competition
In this scenario you again have a 15 year old athlete who severely sprained her ankle three weeks ago, and there is an important qualifying meet coming up this weekend. The athlete is of average ability, you would not expect her to end in the top 8 or 10, even with her best performance. What would your decision be?

score:

comments:

7.4) Severe 15 Year Old One of Your Best Athletes Invitational Tournament
This is again a severe injury. The athlete is 15 years old and she is one of your best athletes. The competition is an invitational tournament.

score:

comments:

7.5) Moderate 8 Year Old One of Your Best Athletes Important Qualifying Competition
In this scenario the injury is moderate. The athlete is 8 years old. The competition that is coming up is an important qualifying meet. The athlete is one of your best athletes and she would almost certainly place in the top 8 of her category if she could compete well.

score:

comments:

7.6) Severe 8 Year Old Athlete of Average Ability Invitational Tournament
In this situation, you again have an 8 year old athlete, but this time she is of average ability. She severely sprained her ankle 3 weeks ago, and the competition coming up is an invitational tournament.

score:

comments:

7.7) Severe 15 Year Old Athlete of Average Ability Invitational Tournament
This situation is similar to the previous one, but the athlete is 15 years old. So, a 15 year old athlete of average ability who severely sprained her ankle 3 weeks ago, and an invitational tournament coming up.

score:

comments:

7.8) Severe 8 Year Old Athlete of Average Ability Important Qualifying Competition
This is again a severe injury. The athlete is 8 years old and the meet that is coming up is an important qualifying competition. The athlete is of average ability.

score:

comments:

That was the end of the series of scenarios. Now I still have a few questions left, but I would first like to ask you if you have any comments about the scenarios?

(If not already done) Can you tell me a little bit about how you made your decisions?

comments:

8) INJURY CARE

8.1) Have you taken any courses or workshops or seminars that are related to injury care and management?

1) YES 2) NO

if yes: a) Can you list them for me?
Be as specific as possible.
b) Do you have any other related experiences?

9) HISTORY OF PERSONAL INJURIES

9.1) Have you ever had an ankle injury yourself? **1) YES 2) NO**

if yes: a) Was this a
1) mild or moderate sprain 2) severe sprain 3) broken ankle4) other:

b) How old were you when it happened? **age:**

comments:

9.2) Have you ever had an injury that kept you out of an important competition?

1) YES 2) NO

if yes: a) How old were you? **age:**
b) Do you remember how you felt about that?

answer:

9.3) Have you ever competed with an injury? **1) YES 2) NO**

if yes: a) Was this a
1) bad experience 2) good experience 3) neither good nor bad experience

comments:

9.4) Have you ever had an injury that is still affecting you up to this day? That is, it either causes you discomfort or pain or limits your mobility.

1) YES 2) NO

if yes:

a) How long ago did it happen? **answer:**

b) Which bodypart was involved? **answer:**

c) To what extent does it still affect you? **answer:**

d) Do you think that the fact that it is still affecting you today
1) is due to bad luck, because it was just a bad injury
2) could have been prevented with better management or treatment

comments:

9.5) Have you ever known an athlete who experienced negative consequences as a result of competing with an injury? It does not have to be an athlete that you were coaching yourself.

1) YES **2) NO**

if yes:

A) What were these negative consequences?

answer:

B) What was your relationship to this athlete?

1) teammate **2) coach** **3) friend** **4) parent** **5) other:**

comments:

10) PHILOSOPHY

10.1) Do you think that, in general, the family doctors of your athletes are familiar enough with athletic injuries in gymnastics to give appropriate recommendations?

1) YES **2) NO** **3) Don't know**

if no:

a) In what sense do you usually find their recommendations inappropriate?

answer:

b) If an athlete comes to you with recommendations of a family doctor, how do you usually handle that?

answer:

c) If a family doctor recommends a period of rest, do you generally find that this period is

1) over-estimated **2) under-estimated**

comments:

11) CURRENTLY INJURED ATHLETES

11.1) Do you have any athletes who are currently injured? **1) YES** **2) NO**

if yes:

a) Is there a competition coming up that this athlete may or may not compete in?

if yes:

b) How will this decision be made?

This was the last question that I had. Is there anything you would like to ask or add to what you have told me so far?

Thank you very much for your co-operation. I really appreciate you taking the time to answer my questions.

APPENDIX C: extra information

EXTRA INFORMATION moderate injury

doctor

- Has the athlete seen a doctor?

  Yes.
- What did the doctor say?

  The doctor took X-rays; he said that nothing was broken; he suggested that the athlete should take it easy until it feels better, and that she can keep doing the activities that do not bother her.
- Did I talk to the doctor personally?

  No, the message was conveyed through the athlete (15 year old) or her parents (8 year old).
- Has the athlete seen a physiotherapist?

  Has the athlete been treated by a physiotherapist?

  No
- Is the ankle taped?

  The athlete got an ankle brace when she went to see her physician and has been training with it.

parents

- What do the parents want?

  I would leave the decision up to the parents.

  The parents are concerned about the athlete, but they trust that you will make the right decision.

training

- How much has the athlete been able to train in the past week?

  She did not do anything for the first three days. After that she has been doing some stretching and elements in which she did not need her feet. Today is the first day that she is doing full routines including mounts, dismounts and tumbling. She is limping after she performs one or two elements in which she used her feet.
- What is the quality of her performance like?

  Her non weight-bearing elements are fine. The elements in which she needs her feet are at about 70% of her normal ability.

medical aspects

- How serious is the injury?

  What is the medical name for this injury?

  It is a second degree ankle sprain, involving some minor tearing of the anterior talo-fibular ligament.
- Has the athlete or the ankle been injured before, recently?

  The athlete has not sprained her ankle before and has not had any injuries that needed medical treatment within the last two years.
- Does the athlete have any other medical problems?

  No.
- Is the athlete taking any medication?

  No.
- How is the circulation?

  Fine.
- How is the athlete's muscle strength?

  There is a minimal decrease, mostly due to pain during movement.
- How is the athlete's proprioception?

  There is a minimal decrease.
- What is the athlete's balance like?

  Standing balance is minimally effected (90%). Dynamic balance is at 70%.
- What is the Range of Motion?

  There is minus 5 degrees of dorsi flexion and minus 10 degrees of plantar flexion compared to the other side. Plantar flexion is painful if you take it to the end range. In lay terms, this means that there is a little difficulty in pointing the toes down completely and pulling them up.

Appendix C: extra information

EXTRA INFORMATION severe injury

doctor

- Has the athlete seen a doctor?

  Yes
- What did the doctor say?

  The doctor said to stay out of gymnastics for about 3 weeks. It is now the end of the third week.
- Did I talk to the doctor personally?

  No, the message was conveyed through the athlete (15 year old) or her parents (8 year old).
- Has the athlete seen a physiotherapist?
  Has the athlete been treated by a physiotherapist?

  No
- Is the ankle taped?

  The athlete got an ankle brace when she went to see her physician and has been training with it.

parents

- What do the parents want?
  I would leave the decision up to the parents.

  The parents are concerned about the athlete, but they trust that you will make the right decision.

training

- How much has the athlete been able to train in the past week?

  She has started to do a little bit on the beam and uneven bars, and she has been trying some mounts and dismounts in the last two days. They are painful, but she says that the pain does not bother her.
- What is the quality of her performance like?

  Her non-weight bearing elements are fine. The elements in which she needs her feet are at about 70% of her normal ability.

medical aspects

- What is the medical name for this injury?
  How serious is the injury?

  It is a severe second degree ankle sprain, involving tearing of both the anterior talo-fibular and the calcaneo-fibular ligament.
- Has the athlete or the ankle been injured before, recently?

  No, the athlete has not sprained her ankle before and has not had any injuries that needed medical treatment within the last two years.
- Does the athlete have any other medical problems?

  No.
- Is the athlete taking any medication?

  No.
- How is the circulation?

  Fine.
- How is the athlete's muscle strength?

  It has decreased a little bit.
- How is the athlete's proprioception?

  There is a some decrease.
- What is the athlete's balance like?

  Standing balance is minimally effected (90%). Dynamic balance is at 70%.
- What is the Range of Motion?

  There is minus 5 degrees of dorsi flexion and minus 20 degrees of plantar flexion compared to the other side. Plantar flexion is painful if you take it to the end range. In lay terms this means that there is some difficulty in pointing the toes all the way down and pulling them up. The ankle feels stiff.

APPENDIX D: statements

Modifications

1 - MODIFICATIONS in competing
11) compete only one or two events; compete bars and/or beam, but not all around
12) water down the level of difficulty of her routines; change or adapt her routines
13) tape; support the foot well; do a good warm-up
14) pull her out of the competition if necessary; see how it goes

Strategies

2 - ALTERNATIVES to competing
21) take her to the meet to watch
22) find another way of rewarding her
23) petitioning; medical bye

3 - OBTAINING INFORMATION, facts or opinions
31) obtaining medical advice through personal communication with a medical person
32) obtaining medical advice, but not obviously through direct personal contact with the doctor or physio involved (e.g. "What did the doctor say?")
33) consult with the parents to see what they think about the situation
34) talk with the athlete to get her opinion on whether she thinks she can compete

4 - SHARING RESPONSIBILITY
41) it is up to the athlete and/or her parents
42) it is up to the athlete and/or her parents, but the coach will give her/his opinion and try to convince them to compete or not
43) it is the coach's decision, but there is the possibility that the parents will veto or reverse veto the decision
44) the decision is a joint decision of the coach, athlete and parents
45) the athlete has quite a bit of input in the decision; coach and athlete make the decision together
46) the athlete has some input
47) discuss the situation with one or more other coaches

5 - DECISION TIME
51) earlier than the night before
52) on the day of the competition, generally during the warm-up

6 - TALKING
61) to assure that the athlete has realistic expectations about competing (e.g. "We are not going in this to win")
62) to explain or justify why the athlete can not compete; to convince the athlete and/or her parents that she is better off not competing

Appendix D: statements

Considerations

7 - INJURY, less likely

71) there has not been enough time to recover; it has only been a week, 3 weeks
72) because it is a severe injury
73) if it hurts; if there is still pain
74) if she has not trained on it very much; if she has not done much weight bearing activities
75) if she is still limping
76) if there is still swelling
77) if there is still limited range of motion
78) if she is still favoring it
79) it is not ready; it is not recovered; it is still weak

8 - INJURY, more likely

81) there has been enough time to recover; she has been off it for a week; it has been 3 weeks
82) it is (only) a moderate injury
83) if it does not hurt; if there is no pain
84) if she can bear weight on it; walk on it

9 - AGE 8

91) less likely, because she has lots of time ahead, many more opportunities to compete; competitions at this age are not important; you don't want to wreck her this early in the game
92) less likely, at this age kids are psychologically not ready to handle an injury, to provide reliable information, to compete under stress
93) less likely, because of physical reasons, e.g. risk of growth plate injuries, sensitive bones
94) more likely, because of physical reasons, e.g. she heals faster, is lighter
95) less likely, we don't compete kids that young

10 - AGE 15

101) more likely, because she is getting near the end of her competitive career; she won't have many opportunities for competing left
102) more likely, at this age they can handle more psychologically, they know their bodies better, communicate better, you can trust their judgment
103) more likely, because of physical reasons, e.g. stronger
104) less likely, because of physical reasons, e.g. taller, heavier, may compensate more

Appendix D: statements

Considerations

11 - ABILITY

111) It does not matter whether she is average or best
112) A less likely, she is Average and not expected to do well or place, not worth the risk; it is not important to compete
113) A less likely, Average athletes are psychologically less capable of handling it
114) A less likely, Average athletes are physically less capable of handling it
115) A more likely, it is psychologically important for an Average athlete to compete in this meet (e.g. for self-esteem or motivation)
116) B less likely, you don't want to risk aggravating the injury with your Best athlete; you don't want to risk a Best athlete's future when she is young, or at an unimportant competition
117) B more likely, it is important that she competes; this meet is important for her; she might do well in this meet

12 - MEET

121) InviTational or Qualifier makes no difference
122) T less likely, invitationals are not important; they are just for fun; there are so many of them
123) T more likely, there is not as much stress; you can be more flexibel; do only one or two events
124) T more likely if it was a peaking meet; if it was an important meet in the athlete's overall plan; if it was important for exposure to the judges
125) T, depending on when the next qualifying meet is
126) Q more likely, because it is an important meet
127) Q, depending on when this meet is, how important it is, whether it can be petitioned

13 - PERFORMANCE

131) less likely, **because** it is unlikely that she will be able to do her moves/routines/skills well enough to make it worthwhile; to get through her routines
132) more likely, if she can do her moves/routines/skills; if she did condition well; if she can land on it
133) less likely **if** she can not do her moves/routines/skills
134) depending on what she can do

14 - the ATHLETE's EXPERIENCE

141) less likely, because it may be a negative experience (in terms of a sense of personal failure; might undermine her confidence, motivation)
142) more likely, because it may be a learning experience for her competitively
143) more likely, because it may be a learning experience for her at a personal level
144) more likely, because it may be a positive experience for her in terms of a sense of personal achievement; because not competing might be a negative experience, personal failure
145) more likely, because it may be a positive experience for her in terms of fun and social contact
146) more likely, because it may be one of her goals to compete in this meet
147) more likely, because she has worked hard

Appendix D: statements

Considerations

15 - the ATHLETE's PERSONAL CHARACTERISTICS
(any specific mention of a personal feature of an athlete that would make a difference in the coach's decision; e.g. "if she can handle pain well I would let her, if she is a whiner I would not")
151) motivation, keenness, eagerness, ambition
152) mental state or mental ability during competition
153) self-esteem
154) pain tolerance and mental toughness
155) physical factors: speed of healing, body build, strength

16 - the ATHLETE's WISHES
161) unlikely, no, even though she wants to
162) quite likely, very likely if she really wants to, if she is eager, keen
163) maybe; it may be considered, if she is very keen and really really wants to; if she puts up a big fight
164) it may be considered if she really wants to, but I would try to convince her not to, hold her back
165) more likely if she thinks she can do it
166) less likely if she is very keen, because she'll pretend she is okay when she is not

17 - the DOCTOR
171) if the doctor said okay, then competing would depend on other factors (e.g. if her routines can be watered down)
172) less likely, if the doctor said not okay, a high risk of reinjury
173) more likely, if the doctor said okay

18 - the PARENTS
181) more likely, if they really want her to

19 - the ATHLETE's competitive LEVEL
191) unlikely, competing is not important at this low level; fun is more important at this level
192) more likely, at this low level there is not much risk because the skills are so simple
193) less likely, at this high level the skills are too risky
194) the level makes a difference as to the changes that can be made in her routines
195) if it was national or international level it would be different

20 - the perceived RISKS of competing injured
(concerns mentioned about what might happen if the athlete competed with the injury)
201) aggravating the injury; make it worse: injure it more; re-injure it
202) sustaining an injury to the opposite limb; sustaining another injury
203) doing permanent damage; chronic injury; hurting her for life
204) not competing as well as usual and doing psychological damage
205) missing a lot more training and competitions; ruining the rest of the year
206) if it is just a moderate injury, it won't hurt her; it is not much of a risk

APPENDIX E: table of background variables

	range	mean	s.d.	mode
age	16-57	28.6	8.1	
years of experience	1-35	9.5	7.1	2, 7
# athletes coached	4-42	18.9	22.0	6

gender	male	15	23.4%	**former competitor**	yes	59	92.2%
	female	49	76.6%		no	5	7.8%

NCCP certification	none	2	3.1%	**general education**	*high school	11	17.2%
	I compl.	3	4.7%		*college	10	15.6%
	II part.	3	4.7%		*partial	14	21.9%
	II compl.	21	32.8%		*B.A./ B.sc.	28	43.8%
	III part.	17	26.6%		*Masters	1	1.6%
	III comp.	14	21.9%				
	IV part.	1	1.6%				
	IV compl.	3	3.1%				

Injury education							
miscellaneous organized experiences (workshops, clinics etc.)	none	38	59.4%	**personal experiences**	not mentioned	45	70.3%
	one	4	6.3%		people familiar	2	3.1%
	a couple	12	18.8%		job	7	10.9%
	quite a few	5	7.8%		own injury	3	4.7%
	many	5	7.8%		reading	1	1.6%
					talking	5	7.8%
					other	1	1.6%
first aid	not mentioned	16	25.0%	**CPR**	not mentioned	53	82.8%
	standard	14	21.9%		yes	11	17.2%
	athletic	8	12.5%				
	both	17	26.6%				
	type not indicated	9	14.1%				
PE-courses	none	36	56.3%	**amount of injury education**	very little	21	32.8%
	PE-degree	13	20.3%		low-moderate	12	18.8%
	PE-degree in AT	4	6.3%		hi-moderate	18	28.1%
	some courses in PE	9	14.1%		high	7	10.9%
	1 course in AT	2	3.1%		very high	6	9.4%

	Highest level currently coached		Highest level coached ever		Highest level competed	
High performance	8	12.5%	11	17.2%	5	7.8%
National Stream	5	7.8%	12	18.8%	5	7.8%
Class IV	8	12.5%	11	17.2%	19	29.7%
Class III	12	18.8%	13	20.3%	13	20.3%
Class II	16	25.0%	12	18.8%	7	10.9%
Class I	10	15.7%	5	7.8%	10	15.7%
not	5	7.8%	0	0.0%	5	7.8%

Appendix E: table of background variables

Injury history							
ankle injuries	yes	51	79.7%	severity	mild/moderate	12	23.5%
	no	13	20.3%		severe	23	45.1%
					both	16	31.4%
				number	one	23	45.1%
					several	15	29.4%
					many	13	25.5%
				age first ankle injury	range		
missed important competition	yes	26	40.6%	emotions missing competition	neutral	9	34.6%
	no	38	59.4%		negative	17	65.4%
competed with injury	yes	40	62.5%	experience competing injured	good	14	35%
	no	24	37.5%		neutral	16	40%
					bad	10	25%
injury still affecting	yes	45	70.3%	degree still affecting	minor	16	35.6%
	no	19	29.7%		moderate	22	48.9%
					major	7	15.6%
				ways still affecting	*limits sports	14	31.1%
					*bothersome, but not limiting	12	26.7%
					* be aware	10	22.2%
					* definitely affecting	7	15.6%
					*not indicated	2	4.4%
				could have been prevented	yes	21	46.7%
					no	12	26.7%
					don't know	6	13.3%
					not indicated	6	13.3%
knowing athlete who experienced negative consequences	yes	32	50%	relationship to athlete	* knew personally	17	53.1%
	no	32	50%		* specific other	7	21.9%
					* general others	8	25.0%
				type of consequences	physical	23	71.9%
					emotional	9	28.1%